

## **ATTACHMENT D**

### **WATER FLOW DIAGRAM**

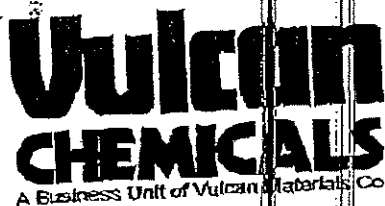
## **ATTACHMENT E**

### **MSDS SUMMARY INFORMATION**

## SUMMARY PAGE FOR MSDS SHEETS

<u>Manufacturer</u>	<u>Trade Name</u>	<u>Common Name</u>	<u>Description</u>
Brenntag (Vulcan Chemicals)	Chlorine Gas	Chlorine	Gaseous Chlorine for Micro-biological control
Brenntag (Georgia-Pacific Corp)	Sodium Hypochlorite	Hypochlorite	Liquid Chlorine for Micro-biological control
Betz Laboratories Inc	Powerline 1200P	Hydroquinone	Oxygen Scavenger/Metal Passivator solution
Brenntag (Shrieve Chemical Co.)	Sulfuric Acid	Sulfuric Acid	Demineralizer Water Treatment (pH Control)
Gulf Coast Chemical Commercial, Inc.	Sodium Phosphate Tribasic	Trisodium Phosphate	Water Treatment Dispersant
Fisher Scientific Chemical Division	Sodium Hydroxide (Beads)	Caustic Soda	Water Treatment (pH adjustment)
Brenntag (Dow Chemical USA)	Sodium Hydroxide Liquid	Caustic Soda	Water Treatment (pH adjustment)
Fisher Scientific Chemical Division	Sulfuric Acid	Sulfuric Acid	Water Treatment (pH adjustment)
Betz Industrial, Inc	OPTI-MEEN-85218	OPTI-MEEN	Water Treatment for Macro-invertebrate growth
Betz Laboratories, Inc	Betz Polymer CDP-90192	Polymer	Coagulant
Gulf Coast Chemical Commercial, Inc.	Sodium Phosphate Dibasic	Disodium Phosphate	Boiler Water Treatment
Gulf Coast Chemical Commercial, Inc.	Potassium Phosphate Dibasic	Potassium Phosphate	Boiler Water Treatment
Gulf Coast Chemical Commercial, Inc.	Polymer 577	Polymer	Flocculant
Fini Enterprises (FE-3), Inc	Ferric Sulfate Solution	Ferric Sulfate	Precipitating agent

07/18/2002 16:15 918-273-2268



# MATERIAL SAFETY DATA SHEET

24 Hour Emergency Phone 316/524-5751

## SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME  
Chlorine

CHEMICAL NAME  
Chlorine

SYNONYMS  
Liquid Chlorine

MANUFACTURER  
Vulcan Chemicals, P O Box 386015, Birmingham, AL 35238-6015

## SECTION 2 COMPOSITION INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS NUMBER	% RANGE	OSHA PEL
* Chlorine	7782-50-6	100	1.0 ppm Ceiling

\* Denotes chemical subject to reporting requirements of Section 312 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372

## SECTION 3 HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

A greenish-yellow gas or amber liquid with a pungent odor

**DANGER!** Liquefied, nonflammable gas under pressure

May be fatal if inhaled. Causes severe burns. Corrosive to eyes, skin and mucous membranes in presence of moisture. Harmful if absorbed through skin.

### POTENTIAL HEALTH EFFECTS

#### INHALATION

Inhalation is the major potential route of exposure. Chlorine is a respiratory irritant. Chlorine is irritating and can be corrosive to the eyes, skin, and mucous membranes. Symptoms of exposure include burning of eyes, nose, and mouth. Other symptoms of overexposure can include nausea, vomiting, dizziness, shortness of breath and chest pain. Exposures to higher concentrations can cause unconsciousness and death. Pulmonary edema and chemical pneumonia can develop and may occur hours after exposure.

#### SKIN

Liquid contact can cause local irritation and burns. Chlorine vapors can cause irritation, burning and blisters.

#### EYE

Liquid contact can cause irritation and burns. Vapor concentrations of 1 ppm can cause redness, tearing and irritation of eyes.

#### INGESTION

Chlorine is gas at room temperature. Ingested liquid chlorine can cause severe burns of mouth, esophagus and stomach. Nausea and vomiting are likely to occur.

#### MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Asthma, bronchitis, emphysema and other lung diseases, and chronic nose, sinus or throat conditions.

Chlorine

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CHEMICALS****MATERIAL SAFETY DATA SHEET**

**INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY**  
Smokers may be more sensitive to respiratory effects of chlorine.

**CHRONIC EFFECTS**  
Chlorine is not listed on the IARC, NTP or OSHA carcinogen lists.

**SECTION 4 FIRST AID MEASURES****INHALATION**

Remove to fresh air until symptoms disappear. If breathing remains difficult, administer oxygen and contact a physician immediately. If breathing stops, start artificial respiration and call for emergency assistance immediately. Keep patient warm and at rest.

**SKIN**

Remove contaminated clothing and shoes. Wash exposed area thoroughly with large quantities of water for at least 15 minutes. Wash contaminated clothing before reuse.

**EYES**

Flush eyes immediately with water for at least 15 minutes, periodically lifting the upper and lower eyelids. Call a physician at once if irritation of the eyes, skin or other body surfaces persists.

**INGESTION**

Do not induce vomiting. If person is conscious, give water or milk and contact physician immediately. Do not give anything by mouth if unconscious.

**NOTES TO PHYSICIAN**

Monitor closely for delayed onset of pulmonary edema and chemical pneumonia. Provide treatment as is medically indicated.

See Section 11 for Toxicological Information

**SECTION 5 FIRE FIGHTING MEASURES****FLAMMABLE PROPERTIES**

**FLASH POINT**  
None

**AUTOIGNITION TEMPERATURE**  
N/A

**FLAMMABLE LIMITS IN AIR (PERCENT BY VOLUME)**  
Nonflammable but does support combustion.

**HAZARDOUS COMBUSTION PRODUCTS**

Nonflammable, but is a strong oxidizer. Most combustibles will burn in chlorine forming toxic gasses.

**EXTINGUISHING MEDIA**

Nonflammable, use agent suitable for surrounding fire.

**FIRE FIGHTING INSTRUCTIONS**

Approach fire from upwind. If no chlorine is escaping, apply water spray to keep fire-exposed containers cool. Do not apply water to leaking containers. Remove chlorine containers from fire zone if possible. Extinguish fire using agent suitable for surrounding fire. Flame impingement on steel chlorine container will result in iron/chlorine fire causing rupture of the container.

Firefighters should wear self-contained, positive-pressure breathing apparatus, and a one piece, total-encapsulating suit of Butyl coated nylon or equivalent.



## MATERIAL SAFETY DATA SHEET

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7/27/01  
Page 3 of 7**SECTION 6 ACCIDENTAL RELEASE MEASURES**

Evacuate unprotected personnel upwind or crosswind for at least 200 feet (300 feet for large spills) out of danger area. Wear one-piece, total encapsulating suit of Butyl coated nylon or equivalent with self-contained breathing apparatus. Isolate leak to whatever extent possible. If a chlorine container is leaking, try to position it so that gas rather than liquid leaks; apply emergency kit device if possible. For other than minor leaks, immediately implement predetermined emergency plan. Call CHEMTREC or supplier when help is needed.

Notify National Response Center (800/424-8802) of uncontained releases to the environment in excess of the RQ. See Section 15 for regulatory information.

**SECTION 7 HANDLING AND STORAGE****HANDLING**

Avoid contact with skin and avoid breathing vapors. Use only with adequate ventilation. Do not get in eyes or on skin or on clothing. Wash thoroughly after handling. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any clothing or shoes which become contaminated with chlorine should be removed immediately and thoroughly laundered before wearing again.

Do not attempt to handle, store, or use chlorine without complete review of The Chlorine Institute's *Chlorine Manual*. Any use as a pesticide must be in a manner consistent with the labeling.

Follow protective controls set forth in Section 8 when handling this product. Vapors are heavier than air and will collect in low areas. Do not enter confined spaces such as tanks or pits without following proper entry procedures as required by 29 CFR 1910.146.

**STORAGE****STORAGE CONDITIONS**

Keep away from heat and open flame. Store properly labeled containers in a cool, dry, well-ventilated area away from incompatible materials (See Section 10) and away from basements, pits, etc. Isolate from acetylene, ammonia, hydrogen, hydrocarbons, ether, turpentine, and finely divided metals. Make daily inspections for leaks. Room vents should be located at floor level. Do not apply heat to a chlorine container. Do not remove or deface label or tags.

Chlorine piping and equipment must be thoroughly cleaned of organics and moisture before use. Keep chlorine piping and handling equipment clean and dry. Liquid chlorine lines must have suitable expansion chambers between block valves due to the high coefficient of expansion.

**INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT**

Titanium will react violently with dry chlorine. Dry chlorine will also react with aluminum and tin. Moist chlorine will react with most metals. Stainless steel can fail due to chloride ion stress corrosion cracking if used in the presence of moisture.

**SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION****ENGINEERING CONTROLS****VENTILATION**

As necessary to maintain vapor concentrations below 1 ppm, at all times.

**PERSONAL PROTECTIVE EQUIPMENT****EYE AND FACE PROTECTION**

Wear safety glasses. Contact lenses should not be worn. Chemical goggles should be worn when operating valves and connecting or disconnecting chlorine lines.



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## SKIN PROTECTION

Wear cotton or leather gloves during normal operations to avoid freeze burns.

## RESPIRATORY PROTECTION

Where vapor concentration exceeds or is likely to exceed 0.5 ppm, a NIOSH approved full face chlorine type respirator is acceptable. A NIOSH approved self-contained breathing apparatus, with full facepiece, is required for vapor concentrations above 10 ppm and for leaks and/or emergencies. Follow any applicable respirator use standards and regulations.

## GENERAL

Protective equipment and clothing should be selected, used, and maintained according to applicable standards and regulations. For further information, contact the clothing or equipment manufacturer or the Vulcan Chemicals Technical Service Department.

## EXPOSURE GUIDELINES

ACGIH: 0.5 ppm (8 hr) TWA, 1 ppm STEL

OSHA: 1.0 ppm Ceiling

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH  
10 ppm

## ODOR THRESHOLD

Odor threshold approximately 0.3 ppm - highly variable especially with individuals routinely exposed.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

## CHEMICAL FORMULA

$\text{Cl}_2$

## MOLECULAR WEIGHT

70.91

## APPEARANCE AND ODOR

Greenish-yellow gas, amber liquid;  
pungent odor

## SPECIFIC GRAVITY

Liquid = 1.467 @ 0°C

## VAPOR PRESSURE

71 psig @ 60°F

## VOLATILES, PERCENT BY VOLUME

100

## BOILING POINT

-29.32°F (-34.07°C)

## VAPOR DENSITY

2.5 (Air = 1)

## EVAPORATION RATE

Not Applicable

## SOLUBILITY IN WATER

Slight

## SECTION 10 STABILITY AND REACTIVITY

## CHEMICAL STABILITY

Stable

## CONDITIONS TO AVOID

Dry chlorine is highly reactive with titanium and tin. Reacts with most metals at high temperatures. Reacts with water to produce hydrochloric and hydrochlorous acids, which are corrosive to most metals.

## INCOMPATIBILITY WITH OTHER MATERIALS

Ammonia, elemental metals, certain metal hydrides, carbides, nitrides, oxides, phosphides and sulfides, easily oxidized materials, organic materials (e.g. petrochemicals, oils, greases) and unstable and reactive compounds.



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## HAZARDOUS DECOMPOSITION PRODUCTS

Will not decompose.

## HAZARDOUS POLYMERIZATION

Will not occur.

## SECTION 11 TOXICOLOGICAL INFORMATION

## ACUTE TOXICITY

## INHALATION

Concentrations of 3-6 ppm can cause irritation of the nose and mucous membrane of the upper respiratory tract followed by headache and coughing. 10 ppm can cause severe irritation of respiratory tract with 15-20 ppm causing intense cough. Exposures to concentrations above 25 ppm can cause unconsciousness and death.

Exposures to humans to .5 ppm for 8 hours and 1 ppm for 4 hours have caused transient decreased pulmonary capacity, as measured by pulmonary function tests. In persons exposed to acute, non-lethal levels, decreased pulmonary capacity is followed by a gradual return to normal. In some cases long lasting effects have been observed.

## ANIMAL TOXICOLOGY:

Inhalation LC<sub>50</sub>: 293 ppm - 1 hour (rat)Inhalation LC<sub>50</sub>: 137 ppm - 1 hour (mouse)

## CHRONIC TOXICITY

Numerous studies have been conducted to determine the potential chlorine has to cause chronic effects. In rats exposed to concentrations up to 8 ppm for 6 hours a day, 5 days a week for 6 weeks, decreases in body weight and inflammation of the respiratory tract were observed. At exposures of 3 and 8 ppm, changes in the liver and kidneys were also noted. Rabbits and guinea pigs exposed to 1.7 ppm for 9 months showed weight loss and a decreased resistance to disease.

No adverse effects were observed in rabbits and guinea pigs at levels of 1.7 ppm. Guinea pigs exposed to 1.6 ppm for 5 hours a day, for 42 days and injected with tuberculosis (bacteria) displayed shorter life cycles, than those exposed to just one of the agents. Rats with pulmonary disease showed an increased response to chlorine. Rhesus monkeys exposed to concentrations up to 2.3 ppm for 6 hours a day, 5 days a week for one year did not exhibit any signs of chronic toxicity, except for eye irritation.

A study of 600 diaphragm cell workers from 25 plants with an average duration of exposure of 11 years exposed to .006 to 1.42 ppm, showed no statistically significant increase in abnormal chest x-rays, EKGs or pulmonary function tests.

## CARCINOGENICITY

One study has been conducted to evaluate chlorine's ability to cause cancer in experimental animals. Seven generations of rats were exposed by ingestion to highly chlorinated water daily (100 mg/liter). No increased incidences of tumors were observed.

Chlorine is not listed on the IARC, NTP or OSHA carcinogen lists.

## REPRODUCTIVE TOXICITY

Two studies have been conducted to assess the ability of chlorine to cause reproductive effects. Rabbits exposed by inhalation to concentrations up to 1.5 ppm and rats exposed by ingestion to highly chlorinated drinking water daily for seven generations did not display any adverse reproductive effects.



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**SECTION 12 ECOLOGICAL INFORMATION****ENVIRONMENTAL FATE:**

Water: Chlorine is a strong oxidizer and will react rapidly with inorganic compounds. Chlorine will also oxidize organic compounds, but at a slower rate than inorganic compounds. The presence of light accelerates the dissipation of chlorine in water.

**ECOTOXICITY**Acute LC<sub>50</sub> (96 Hours) for Fathead Minnow:

0.07 - 0.15 ppm

Acute LC<sub>50</sub> (96 Hours) for Bluegill:

0.44 mg/l.

**SECTION 13 DISPOSAL CONSIDERATIONS**

All disposals of this material must be done in accordance with local, state and Federal regulations. Waste characterization and compliance with disposal regulations are the responsibilities of the waste generator.

**SPILL RESIDUES**

Chlorine gas will disperse to the atmosphere leaving no residue. Chlorine may be neutralized by introducing it into caustic soda, soda ash, or hydrated lime. Liquid and/or solid residues from neutralization must be disposed of in a permitted waste management facility. Consult federal, state, or local disposal authorities for approved procedures.

**SECTION 14 TRANSPORT INFORMATION****DOT IDENTIFICATION NO.**

UN 1017

**DOT SHIPPING DESCRIPTION (49 CFR 172.101)**

Chlorine, 2.3, Poison Gas, UN 1017, RQ

Poison-Inhalation Hazard, Hazard Zone B, Marine Pollutant

**PLACARD REQUIRED**

Poison Gas, 1017, Class 2

**LABEL REQUIRED**

Poison Gas, Class 2, Corrosive

Label as required by OSHA Hazard Communication Standard, and any applicable state and local regulations.

**IMO REQUIREMENTS**

EmS No.: 2-08

MFAG Table No.: 740 Marine Pollutant IMDG Code Page: 2116

**SECTION 15 REGULATORY INFORMATION****U.S. FEDERAL REGULATIONS****REPORTABLE QUANTITY (RQ)**

Reportable Quantity (RQ) is 10 lbs.

**TOXIC SUBSTANCES CONTROL ACT**

Listed on TSCA Inventory

**SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III**

Components identified with an asterisk (\*) in Section 2 are subject to the reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372.



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SARA HAZARD CATEGORIES (40 CFR 370.2)

HEALTH: Immediate Health PHYSICAL: Fire, Sudden Release of Pressure

## INTERNATIONAL REGULATIONS

### CANADA

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) CLASSIFICATION

WHMIS Classifications applicable to this product

A (Compressed Gas) based on vapor pressure

C (Oxidizing Material)

D-1A (Very Toxic Material) based on inhalation toxicity.

E (Corrosive Material) based on assignment to TDG Class 2, Division 4

### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

All components of this product are on the Domestic Substances List (DSL).

### HAZARDOUS PRODUCTS ACT

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR).

### EUROPE

EINECS No.: 231-959-5

### STATE REGULATIONS

#### CALIFORNIA PROPOSITION 65

Chlorine does not appear on the California Proposition 65 list.

## SECTION 16 OTHER INFORMATION

### NFPA RATINGS

Health 4; Flammability 0; Reactivity 0; OX

#### Medical Emergencies:

Call collect 24 hours a day  
for emergency toxicological  
information 415/524-3182

#### Other Emergency Information:

Call 316/524-6751 (24 Hours)

#### For any other information contact:

Vulcan Chemicals

Technical Service Department

P.O. Box 385015

Birmingham, AL 35238-5015

800/673-4898

8 AM - 4 PM Central Time

Monday through Friday

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NO WARRANTY IS MADE, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE.

Date of Preparation: July 27, 2001

FORM 3239-310

Thursday, July 19, 2002

# MATERIAL SAFETY DATA SHEET

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** Sodium Hypochlorite 10% sol.  
**DOCUMENT IDENTIFIER:** 449500  
**SYNONYMS:** Liquid bleach  
**CHEMICAL FAMILY NAME:** Inorganic, salt  
**NFPA HAZARD RATINGS (H-F-R):** 2-0-1  
**HMS HAZARD RATINGS (H-F-R):** 2-0-1  
**DISTRIBUTOR:** Brenntag Southwest, Inc.  
**IN CASE OF EMERGENCY CALL:** 1-800-424-9300

**MSDS PREPARED BY:** Brenntag Southwest, inc.  
610 Fisher Road  
Longview, TX 75604  
(903) 759-7151

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENTS	CAS NUMBERS	Percent
Sodium Hypochlorite	007681-52-9	10

Remainder consists of non-hazardous and/or other ingredients below reportable levels.  
Trace impurities and additional material names not listed above may also appear in the Regulatory Information Section (Section 15) towards the end of the MSDS.  
These materials may be listed for local "Right to Know" compliance and for other reasons.

## 3. HAZARDOUS IDENTIFICATION

**EMERGENCY OVERVIEW:** DANGER! Oxidizer! May cause burns to skin and eyes.  
May be harmful if swallowed or inhaled.

### POTENTIAL HEALTH EFFECTS:

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**SKIN CONTACT:** May cause moderate to severe irritation consisting of discomfort, itching, reddening and swelling.  
Contact with the skin can cause chemical burns.

**SKIN ABSORPTION:** No data available

**EYES:** Contact with the eyes causes redness, tearing, and blurred vision.  
May cause burns to eyes.

**INGESTION:** Ingestion causes pain and inflammation of the mouth, gastrointestinal tract, and erosion of the mucous membranes.

**INHALATION:** Inhalation may cause irritation, burning sensation, coughing, wheezing, laryngitis, shortness of breath, or headache.  
May cause lung damage/edema.

**MEDICAL CONDITIONS AGGRAVATED:**  
No data available

This product does not contain any chemicals reportable under California Proposition 65.  
Components found on one of the OSHA designated carcinogen lists are listed below.

INGREDIENT	NTP	IARC	OSHA
Sodium Hypochlorite	N	N	N

#### 4. FIRST AID MEASURES

**SKIN CONTACT:** Remove contaminated clothing and shoes.  
Wash exposed areas with soap and water.  
Call a physician if irritation persists.

**EYE CONTACT:** Flush eyes with water for at least 15 minutes.  
Get immediate medical attention.

**INGESTION:** Do not induce vomiting. Give 1-2 glasses of water to dilute. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs.  
Do not give anything by mouth to an unconscious person.  
Get immediate medical attention.

**INHALATION:** Remove to fresh air.  
If breathing has stopped, give artificial respiration.  
Get immediate medical attention.

**NOTES TO PHYSICIAN:** No data available

#### 5. FIRE FIGHTING MEASURES

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**FIRE AND EXPLOSIVE PROPERTIES**

<b>FLASH POINT:</b>	Not applicable °F
<b>FLASH POINT:</b>	Not applicable °C
<b>FLASH POINT METHOD:</b>	Not applicable
<b>LOWER FLAMMABILITY LIMIT:</b>	Not available
<b>UPPER FLAMMABILITY LIMIT:</b>	Not available
<b>AUTO IGNITION TEMPERATURE:</b>	Not available °F, Not available °C
<b>FLAMMABILITY CLASSIFICATION:</b>	Not applicable
<b>EXTING. MEDIA:</b>	This product is not flammable. Use extinguishing media for surrounding fire.
<b>FIRE FIGHTING:</b>	Use water spray to disperse vapors and to provide protection for persons attempting to stop leak. Cool fire-exposed containers with water spray.
<b>PROTECTIVE EQUIPMENT:</b>	Use NIOSH-approved self-contained breathing apparatus and complete protective clothing when fighting chemical fires.
<b>FIRE HAZARDS:</b>	Closed containers of this product may explode when exposed to excessive heat. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Avoid contact with combustible materials. May ignite or explode on contact with combustible materials.

**6. ACCIDENTAL RELEASE MEASURES**

<b>SMALL SPILLS:</b>	Contain spill and ventilate area. Absorb on inert media and containerize for disposal.
<b>LARGE SPILLS:</b>	Contain spill and ventilate area. Permit only trained personnel wearing full protective equipment to enter the spill area. Collect the spill in a waste container or remove with a vacuum truck. Prevent spill from entering natural watercourses.

**PROTECTIVE EQUIPMENT\ SPILL-RELEASE INSTRUCTIONS:**

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Do not use combustible absorbents. Wear complete protective clothing when cleaning up chemical spills. Spills and releases may have to be reported to federal and/or local authorities. See the Regulatory Information section (section 14) regarding reporting requirements.

## 7. HANDLING AND STORAGE

**HANDLING:** Avoid contact with skin, eyes, and clothing.  
Avoid breathing product vapors and mists.  
Do not take internally.  
Wash thoroughly after handling this material.  
Use this material only with adequate ventilation.

**STORAGE:** Keep container closed when not in use.  
This material should be stored in a dry, cool place. Store in well-ventilated areas and at moderate temperatures.  
Protect against physical damage.  
The empty container is hazardous.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### ENGINEERING CONTROLS:

Good general ventilation (typically 10 air changes/hour) should be used. Ventilation rates should be matched to conditions. Use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits.

### PERSONAL PROTECTIVE EQUIPMENT

**SKIN:** Wear protective gloves made of neoprene or rubber.

**EYE:** Wear chemical safety goggles.

**RESPIRATORY:** If engineering controls do not maintain airborne concentrations below recommended limits, wear a NIOSH-approved respirator for dusts and mists.

**OTHER:** Emergency showers, eyewash stations, and fire blankets should be accessible. Wear protective clothing.

### EXPOSURE GUIDELINES:

#### INGREDIENT

ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL
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Sodium Hypochlorite

N/EST N/EST N/EST N/EST

N/EST = Not established

See 29 CFR 1910.1000 (D) (2) and ACGIH "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices" booklet (Appendix C) for the determination of exposure limits for mixtures. Consult an industrial hygienist or similar professional to confirm that the calculated exposure limits are appropriate.

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**9. PHYSICAL AND CHEMICAL PROPERTIES**

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<b>PHYSICAL STATE:</b>	Liquid
<b>APPEARANCE</b>	Clear, pale yellow or green
<b>ODOR:</b>	Chlorine
<b>SPECIFIC GRAVITY:</b>	1.2
<b>SOLUBILITY (IN WATER):</b>	Complete
<b>BOILING POINT (°F):</b>	Not available
<b>BOILING POINT (°C):</b>	Not available
<b>FREEZING POINT (°F):</b>	Not available
<b>FREEZING POINT (°C):</b>	Not available
<b>MELTING POINT (°F):</b>	Not available
<b>MELTING POINT (°C):</b>	Not available
<b>PRODUCT pH:</b>	12-13
<b>VAPOR PRESSURE:</b>	17.5 @ 20 C
<b>REFERENCE PRESSURE:</b>	mm Hg
<b>VAPOR DENSITY:</b>	Not available
<b>EVAPORATION RATE:</b>	Not available
<b>VISCOSITY:</b>	Not available
<b>% VOLATILES:</b>	Not available

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**10. STABILITY AND REACTIVITY**

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<b>STABILITY:</b>	Stable
<b>CONDITIONS TO AVOID:</b>	Exposure to high temperatures should be

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**INCOMPATIBILITY:**

minimized.

Combustible materials

Acids

Amines

Reducing agents

Metals

**DECOMPOSITION:**

Oxides of chlorine

**POLYMERIZATION WILL OCCUR:**

No

**11. TOXICOLOGICAL INFORMATION****IMMEDIATE EFFECTS:**

May cause burns to skin and eyes. May be harmful if swallowed or inhaled. Irritation data: 10 mg eyes-rabbit moderate. Toxicity data: 1 gm/kg oral-woman TD Lo; 45 mg/kg intravenous-man TD Lo, 5800 mg/kg oral-mouse LD50; 140 mg/kg/9 weeks continuous-rat TD Lo.

**CARCINOGENICITY:** No data available**MUTAGENICITY:**

Mutation in microorganisms-Salmonella typhimurium 1 mg/plate (-S9); DNA repair-Escherichia coli 20 ug/disc; DNA damage-Escherichia coli 420 uol/L; phage inhibition capacity-Escherichia coli 103 ug/well; micronucleus test-non-mammalian species multiple 200 ppb; cytogenetic analysis-non-mammalian species multi 120 ug/L; cytogenetic analysis-human lymphocyte 100 ppm 24 hours; sister chromatid exchange-human embryo 149 ng/L; cytogenetic analysis-hamster lung 100 mg/L.

**EPIDEMIOLOGY:** No data available**TERATOGENICITY:** No data available**REPRODUCTIVITY:** No data available**NEUROTOXICITY:** No data available**12. ECOLOGICAL INFORMATION**

Ecotoxicity Data: Fish toxicity: 94.0 ug/L 96 hours LC50 (mortality) Cutthroat trout (Oncorhynchus clarki). Invertebrate toxicity: 31.6 ug/L 7 hours IC50 (species diversity) Protozoan phylum (Protozoa). Algal toxicity: 90 ug/L 96 hours LC50 (mortality) Algae, phytoplankton, algal mat (Algae). Phytotoxicity: 230 ug/L 35 hours (biomass) Curles pondweed (Potamogeton crispus). Other toxicity: 2.1 ug/L 28 days (chlorophyll) Aquatic community (Aquatic community).



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**13. DISPOSAL CONSIDERATIONS**

<b>RCRA WASTE:</b>	Yes
<b>RCRA ID NUMBER:</b>	D002 (If pH >12.5)
<b>VOC CONTENT (lbs/gal):</b>	Not applicable
<b>Waste Disposal Procedure:</b>	Discharge, treatment, or disposal may be subject to Federal, State, or Local laws. State and Local regulations and restrictions are complex and may differ from Federal disposal regulation. The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA Classification and the proper disposal method.

**14. TRANSPORTATION INFORMATION**

<b>D.O.T. SHIPPING NAME:</b>	Hypochlorite solutions (Sodium Hypochlorite)
<b>D.O.T. HAZARD CLASS:</b>	Class 8, No division (Corrosive materials)
<b>DOT ID NUMBER:</b>	UN 1791
<b>DOT PACKING GROUP:</b>	III
<b>DOT RD (lbs):</b>	1000
<b>CONTRIBUTING CHEMICAL:</b>	Sodium Hypochlorite
<b>OTHER:</b>	Labels required: Corrosive
<b>MARINE POLLUTANT:</b>	No

**OTHER REGULATORY INFORMATION**

**IMDG HAZARD CLASS:** 8 - Corrosive materials  
**ICAO HAZARD CLASS:** 8 - Corrosive

**15. REGULATORY INFORMATION****FEDERAL REGULATIONS**

Thursday, July 19, 2002

TSCA (Toxic Substance Control Act):

Yes

SECTION 311/312 HAZARD CLASS:

Immediate (acute) health hazard

SARA TITLE III (Superfund Amendments and Reauthorization Act):

INGREDIENTS	CAS NUMBERS	Section 313	Section 302
Sodium Hypochlorite	007681-52-9	N	N

WHMIS CLASSIFICATION  
(CANADA):

Class E

FOREIGN INVENTORY:

EINECS (European Inventory of Existing  
Commercial Chemical Substances)  
Canadian DSL (Domestic Substances List)STATE RIGHT TO KNOWCALIFORNIA PROP 65

This product does not contain any chemicals reportable under California Proposition 65.

MASSACHUSETTS SUBSTANCE LIST:

Sodium Hypochlorite

NEW JERSEY SUBSTANCE LIST:

Sodium Hypochlorite

PENNSYLVANIA HAZARDOUS SUBSTANCE  
LIST:

Sodium Hypochlorite

16. OTHER INFORMATION

CREATION DATE: 10/10/1997

BETZ LABORATORIES, INC.  
4636 SOMERTON ROAD, TREVOSE, PA. 19053  
BETZ MATERIAL SAFETY DATA SHEET  
EMERGENCY TELEPHONE (HEALTH/ACCIDENT) 800-877-1940

PRODUCT : POWERLINE 1200P

(PAGE 1 OF 3)  
EFFECTIVE DATE 12-27-91  
PRINTED: 27-Dec-1991

REVISIONS TO SECTIONS: 4;EDIT:2

PRODUCT APPLICATION : WATER BASED DISSOLVED OXYGEN SCAVENGER/METAL PASSIVATOR.  
-----SECTION 1-----HAZARDOUS INGREDIENTS-----  
INFORMATION ON PHYSICAL HAZARDS, HEALTH HAZARDS, PEL'S AND TLV'S FOR SPECIFIC  
PRODUCT INGREDIENTS AS REQUIRED BY THE OSHA HAZARD COMMUNICATIONS STANDARD IS  
LISTED. REFER TO SECTION 4 (PAGE 2) FOR OUR ASSESSMENT OF THE POTENTIAL ACUTE  
AND CHRONIC HAZARDS OF THIS FORMULATION.

HYDROQUINONE(1,4-BENZENEDIOL)\*\*\*CAS#123-31-9;POTENTIAL SKIN SENSITIZER;EYE  
IRRITANT;TOXIC(ORAL INGESTION);PEL:2MG/M3;TLV:2MG/M3.

-----SECTION 2-----TYPICAL PHYSICAL DATA-----

PH: AS IS	(APPROX.) 7.5	ODOR: SLIGHT
FL.PT.(DEG.F): >200	SETA(CC)	SP.GR.(70F)OR DENSITY: 1.005
VAPOR PRESSURE(mmHG): 18		VAPOR DENSITY(AIR=1): <1
VISC cps70F: 3		%SOLUBILITY(WATER): 100
EVAP.RATE: <1	ETHER=1	APPEARANCE: BROWN
PHYSICAL STATE: LIQUID		FREEZE POINT(DEG.F): 32

-----SECTION 3-----REACTIVITY DATA-----

STABLE.MAY REACT WITH STRONG OXIDIZERS.DO NOT CONTAMINATE.BETZ TANK  
CLEAN-OUT CATEGORY 'B'

THERMAL DECOMPOSITION (DESTRUCTIVE FIRES) YIELDS ELEMENTAL OXIDES.

BETZ MATERIAL SAFETY DATA SHEET (PAGE 2 OF 3)

PRODUCT: POWERLINE 1200P

-----SECTION 4-----HEALTH HAZARD EFFECTS-----

ACUTE SKIN EFFECTS \*\*\* PRIMARY ROUTE OF EXPOSURE

SLIGHTLY IRRITATING TO THE SKIN.POTENTIAL SKIN SENSITIZER

1 EYE EFFECTS \*\*\*

MODERATELY IRRITATING TO THE EYES

ACUTE RESPIRATORY EFFECTS \*\*\*

MISTS/AEROSOLS MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT

CHRONIC EFFECTS OF OVEREXPOSURE\*\*\*

PROLONGED OR REPEATED EXPOSURES MAY CAUSE BLOOD CELL DAMAGE OR IMPAIR BLOOD CELL FUNCTION.

MEDICAL CONDITIONS AGGRAVATED \*\*\*

NOT KNOWN

SYMPTOMS OF EXPOSURE \*\*\*

PROLONGED, REPEATED EXPOSURE MAY RESULT IN BROWNISH DISCOLORATION OF THE CONJUNCTIVA AND CHANGES IN THE CORNEA WHICH MAY LEAD TO DECREASED VISUAL ACUITY.

PRECAUTIONARY STATEMENT BASED ON TESTING RESULTS \*\*\*

MAY BE TOXIC IF ORALLY INGESTED.

-----SECTION 5-----FIRST AID INSTRUCTIONS-----

SKIN CONTACT\*\*\*

REMOVE CONTAMINATED CLOTHING.WASH EXPOSED AREA WITH A LARGE QUANTITY OF SOAP SOLUTION OR WATER FOR 15 MINUTES

EYE CONTACT\*\*\*

IMMEDIATELY FLUSH EYES WITH WATER FOR 15 MINUTES.IMMEDIATELY CONTACT A PHYSICIAN FOR ADDITIONAL TREATMENT

INHALATION EXPOSURE\*\*\*

REMOVE VICTIM FROM CONTAMINATED AREA TO FRESH AIR.APPLY APPROPRIATE FIRST AID TREATMENT AS NECESSARY

INGESTION\*\*\*

DO NOT FEED ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSIVE VICTIM DILUTE CONTENTS OF STOMACH.INDUCE VOMITING BY ONE OF THE STANDARD METHODS.IMMEDIATELY CONTACT A PHYSICIAN

-----SECTION 6-----SPILL, DISPOSAL AND FIRE INSTRUCTIONS-----

SPILL INSTRUCTIONS\*\*\*

VENTILATE AREA,USE SPECIFIED PROTECTIVE EQUIPMENT.CONTAIN AND ABSORB ON ABSORBENT MATERIAL.PLACE IN WASTE DISPOSAL CONTAINER. THE WASTE CHARACTERISTICS OF THE ABSORBED MATERIAL,OR ANY CONTAMINATED SOIL, SHOULD BE DETERMINED IN ACCORDANCE WITH RCRA REGULATIONS. FLUSH AREA WITH WATER. WET AREA MAY BE SLIPPERY. SPREAD SAND/GRIT.

DISPOSAL INSTRUCTIONS\*\*\*

WATER CONTAMINATED WITH THIS PRODUCT MAY BE SENT TO A SANITARY SEWER TREATMENT FACILITY,IN ACCORDANCE WITH ANY LOCAL AGREEMENT,A PERMITTED WASTE TREATMENT FACILITY OR DISCHARGED UNDER A NPDES PERMIT PRODUCT(AS IS)-

INCINERATE OR BURY IN APPROVED LANDFILL

FIRE EXTINGUISHING INSTRUCTIONS\*\*\*

FIREFIGHTERS SHOULD WEAR POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS(FULL FACE-PIECE TYPE).PROPER FIRE EXTINGUISHING MEDIA: DRY CHEMICAL,CARBON DIOXIDE,FOAM OR WATER

BETZ MATERIAL SAFETY DATA SHEET (PAGE 3 OF 3)

PRODUCT: POWERLINE 1200P

-----SECTION 7-----SPECIAL PROTECTIVE EQUIPMENT-----  
USE PROTECTIVE EQUIPMENT IN ACCORDANCE WITH 29CFR SECTION 1910.132-134. USE  
F<sup>2</sup> PIRATORS WITHIN USE LIMITATIONS OR ELSE USE SUPPLIED AIR RESPIRATORS.

V FILATION PROTECTION\*\*\*

ADEQUATE VENTILATION TO MAINTAIN AIR CONTAMINANTS BELOW EXPOSURE LIMITS  
RECOMMENDED RESPIRATORY PROTECTION\*\*\*

IF VENTILATION IS INADEQUATE OR SIGNIFICANT PRODUCT EXPOSURE IS LIKELY,  
USE A RESPIRATOR WITH DUST/MIST FILTERS.

RECOMMENDED SKIN PROTECTION\*\*\*

RUBBER GLOVES

WASH OFF AFTER EACH USE.REPLACE AS NECESSARY

RECOMMENDED EYE PROTECTION\*\*\*

SPLASH PROOF CHEMICAL GOGGLES

-----SECTION 8-----STORAGE AND HANDLING PRECAUTIONS-----  
STORAGE INSTRUCTIONS\*\*\*

KEEP DRUMS & PAILS CLOSED WHEN NOT IN USE.

STORE WITH MINIMUM EXPOSURE TO LIGHT

HANDLING INSTRUCTIONS\*\*\*

NORMAL CHEMICAL HANDLING

\*\*\*\*\*  
THIS MSDS WAS WRITTEN TO COMPLY WITH THE OSHA HAZARD COMMUNICATION STANDARD  
\*\*\*\*\*

APPENDIX: REGULATORY INFORMATION

THE CONTENT OF THIS APPENDIX REPRESENTS INFORMATION KNOWN TO BETZ ON THE  
EFFECTIVE DATE OF THIS MSDS. THIS INFORMATION IS BELIEVED TO BE ACCURATE.  
ANY CHANGES IN REGULATIONS WILL RESULT IN UPDATED VERSIONS OF THIS DOCUMENT.

...TSCA: ALL COMPONENTS OF THIS PRODUCT ARE LISTED ON THE TSCA INVENTORY  
REPORTABLE QUANTITY(RQ) FOR UNDILUTED PRODUCT:

GALLONS DUE TO HYDROQUINONE ← 4.8 991104 S

...RCRA: IF THIS PRODUCT IS DISCARDED AS A WASTE,THE RCRA HAZARDOUS WASTE  
IDENTIFICATION NUMBER IS: NOT APPLICABLE

...DOT HAZARD/UN#/ER GUIDE# IS: NOT APPLICABLE

...CALIFORNIA SAFE DRINKING WATER ACT (PROPOSITION 65) MATERIALS: NONE

...SARA SECTION 302 CHEMICALS: HYDROQUINONE(123-31-9) ;

...SARA SECTION 313 CHEMICALS: HYDROQUINONE(123-31-9) , 2.0-5.0% ;

...SARA SECTION 312 HAZARD CLASS: IMMEDIATE(ACUTE) AND DELAYED(CHRONIC)

...MICHIGAN CRITICAL MATERIALS: HYDROQUINONE(123-31-9) ;

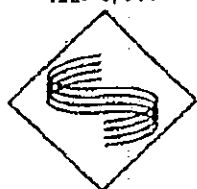
NFPA/HMIS : HEALTH - 1 ; FIRE - 1 ; REACTIVITY - 0 ; SPECIAL - NONE ; PE - B

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# Rhodia

## Shrieve Chemical Company Manufacturer's Safety Data Sheet

**CHEMTREC** 800-424-9300  
**24-HOUR EMERGENCY ASSISTANCE** 800-367-4226  
 SHRIEVE CHEMICAL COMPANY 800-367-4226  
 GENERAL MSDS ASSISTANCE 281-367-4226 ext.111  
 TECHNICAL MSDS ASSISTANCE 281-367-4226 ext.133

## Material Safety Data Sheet

### SULFURIC ACID

Supersedes Date: 12/18/95

RHODIA INC.  
 ECO SERVICES  
 3 Enterprise Drive  
 Box 881  
 Shelton CT 06484

#### Emergency Phone Numbers:

FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CONTACT: CHEMTREC (800-424-9300 within the United States or 703-527-3887 for international collect calls) or Rhodia CAERS (Communication and Emergency Response System) at 800-367-4226.

For Product Information:  
 (800) 642-4200

Chemical Name or Synonym:  
 SULFURIC ACID

Molecular Formula:  
 $H_2SO_4$

Component  
 SULFURIC ACID  
 WATER

CAS Reg Number	OSHA Hazard	Percentage
7664-93-9	Y	65 - 100
7732-18-5	N	BALANCE

#### A. EMERGENCY OVERVIEW:

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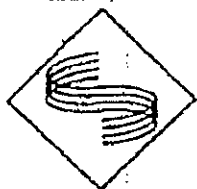
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GENERAL MSDS ASSISTANCE **281-467-4226 ext.111**  
TECHNICAL MSDS ASSISTANCE **281-467-4226 ext.133**

**Physical Appearance and Odor:**  
colorless oily liquid, odorless.

**Warning Statements:**  
DANGER! CAUSES SEVERE BURNS. REACTS VIOLENTLY WITH WATER. CONTENTS MAY BE UNDER PRESSURE OF EXPLOSIVE, FLAMMABLE HYDROGEN GAS. HIGHLY REACTIVE AND CAPABLE OF IGNITING COMBUSTIBLE MATERIAL ON CONTACT.

**B. POTENTIAL HEALTH EFFECTS:**

**Acute Eye:**  
Corrosive. Causes burns, tissue destruction, Can cause blindness.

**Acute Skin:**  
Corrosive. Causes redness, inflammation, burns.

**Acute Inhalation:**  
Harmful if inhaled. Causes upper respiratory tract irritation, lung irritation, chest pain, wheezing, shortness of breath, a burning sensation, tickling of the nose and throat, sneezing.

**Acute Ingestion:**  
Harmful if ingested. Can cause irritation, abdominal pain, corrosion, burns to mouth and esophagus, death.

**Chronic Effects:**  
This product contains ingredients that are considered to be probable or suspected human carcinogens (see Section 11 - Chronic).



**FIRST AID MEASURES FOR ACCIDENTAL:**

**Eye Exposure:**  
Hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. Seek immediate medical attention.

**Skin Exposure:**  
In case of contact, immediately wash with plenty of water for at least 15 minutes. Seek medical attention if irritation develops or persists. Remove contaminated clothing and shoes. Clean contaminated clothing and shoes before re-use.

**Inhalation:**  
Remove victim from immediate source of exposure and assure that the victim is breathing. If breathing is difficult, administer oxygen, if available. If victim is not breathing, administer CPR (cardio-pulmonary resuscitation). Seek medical attention.

**Ingestion:**  
If victim is conscious and alert, give 2-3 glasses of water to drink and do not induce vomiting. Seek immediate medical attention. Do not leave victim unattended. To prevent aspiration of swallowed product, lay victim on side with head lower than waist. Vomiting may occur spontaneously. If vomiting occurs and the victim is conscious, give water to further dilute the chemical.

**MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE:**

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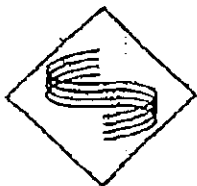
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**GENERAL MSDS ASSISTANCE**  
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**281-367-4226 ext.111**  
**281-367-4226 ext.133**

Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.

**NOTES TO PHYSICIAN:**

All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

This material is an acid. The primary toxicity of this product is due to its irritant effects on mucous membranes.

**INHALATION:** If cough or shortness of breath occurs, evaluate the possibility of bronchitis or pneumonitis. Chest x-ray and arterial blood gases can be used to determine the presence of pulmonary edema. In severe cases, use of humidified oxygen and assisted ventilation including positive end expiratory pressure (PEEP) may be needed. Parenteral steroids may be useful in limiting the extent of pulmonary damage.

**SKIN:** Wash exposed area thoroughly with soap and water. Chemical burns from strong acids are generally treated the same as thermal burns.

**EYES:** Irrigate eyes for 15 minutes with sterile saline. If irritation, pain, swelling, photophobia or lacrimation persist, examination by an ophthalmologist is recommended.

**INGESTION:** If not already performed by first aid personnel, irrigate mouth with large amounts of water and dilute the acid by having victim drink 4 to 8 ounces of water or milk. DO NOT induce vomiting. Use of gastric lavage is controversial. The advantage of removal of acid must be weighed against the risk of perforation or bleeding. If a large amount of acid (> 1 ml/kg body weight) has been recently ingested, cautious gastric lavage is generally advised if the patient is alert and there is little risk of convulsions. Consultation with a gastroenterologist and/or surgeon is advised. Serious complications such as perforation or stricture of the esophagus may occur requiring care by specialists. Laryngeal edema may develop requiring intubation or tracheostomy.

**FIRE HAZARD DATA:**

**Flash Point:**  
Not Applicable

**Extinguishing Media:**

Not combustible. Use extinguishing method suitable for surrounding fire. Recommended (small fires): dry chemical.

**Special Fire Fighting Procedures:**

Firefighters should wear NIOSH/MSHA approved positive pressure breathing apparatus with full face-piece and full acid-resistant protective clothing. Fight fire from maximum distance.

**Unusual Fire and Explosion Hazards:**

Not combustible. Strong oxidizers can react with reducing agents or combustibles producing heat and causing ignition. Reacts violently with water releasing heat and corrosive material.

**Hazardous Decomposition Materials (Under Fire Conditions):**

oxides of sulfur

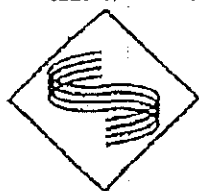


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GENERAL MSDS ASSISTANCE 281-67-4226 ext.111  
TECHNICAL MSDS ASSISTANCE 281-67-4226 ext.133

## II. ACCIDENTAL RELEASE MEASURES

### Evacuation Procedures and Safety:

Personnel handling this material should be thoroughly trained to handle spills and releases. Do not direct hose streams into an unignited transportation spill (tank truck or tank car).

### Containment of Spill:

Stop leak if it can be done without risk. Dike spill using absorbent or impervious materials such as earth, sand or clay. Dike or retain dilution water or water from firefighting for later disposal.

### Cleanup and Disposal of Spill:

Pump any free liquid into an appropriate closed container (see Section 7: Handling and Storage). Exercise caution during neutralization as considerable heat may be generated. Carefully neutralize spill with soda ash. Absorb neutralized spill with an inert absorbent. Scrape up and place in appropriate closed container (see Section 7: Handling and Storage).

### Environmental and Regulatory Reporting:

Do not flush to drain. Runoff from fire control or dilution water may cause pollution. Dispose of as a hazardous waste. Spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies. Large spills should be handled according to a predetermined plan. For assistance in developing a plan contact the Technical Service Department using the Product Information phone number in Section 1.

### Minimum/Maximum Storage Temperatures:

> -36 C (-33 F)

### Handling:

Do not breathe vapors and mists. Do not get on skin or in eyes. This product reacts violently with bases liberating heat and causing spattering.

When diluting an acid, ALWAYS add the acid slowly to water and stir well to avoid spattering. NEVER ADD WATER TO ACID.

### Storage:

Store in tightly closed containers. Store in an area that is dry, well-ventilated, diked with impermeable material.

### Introductory Remarks:

These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. While developing safe handling procedures, do not overlook the need to clean equipment and piping systems for maintenance and repairs. Waste resulting from these procedures should be handled in accordance with Section 13: Disposal Considerations.

Assistance with selection, use and maintenance of worker protection equipment is generally available from equipment

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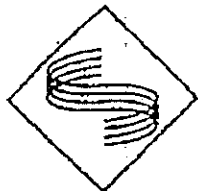
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manufacturers.

**Exposure Guidelines:**

Exposure limits represent regulated or recommended worker breathing zone concentrations measured by validated sampling and analytical methods, meeting the regulatory requirements. The following limits apply to this material, where, if indicated, S=skin and C=ceiling limit:

**SULFURIC ACID**

	Notes	TWA	STEL
ACGIH		1 mg/cu m	3 mg/cu m
OSHA		1 mg/cu m	

**Engineering Controls:**

Where engineering controls are indicated by use conditions or a potential for excessive exposure exists, the following traditional exposure control techniques may be used to effectively minimize employee exposures: local exhaust ventilation at the point of generation.

**Respiratory Protection:**

When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industrial recommendations.

Under normal conditions, in the absence of other airborne contaminants, the following devices should provide protection from this material up to the conditions specified by the appropriate OSHA, WHMIS or ANSI standard(s): Air-purifying (half-mask/full-face) respirator with cartridges/canister approved for use against acid gases.

**Eye/Face Protection:**

Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended for this material.

Eye contact should be prevented through use of chemical safety glasses with side shields or splash proof goggles. An emergency eye wash must be readily accessible to the work area.

**Skin Protection:**

Skin contact must be prevented through the use of permeation resistant clothing, gloves and footwear, selected with regard for use conditions and exposure potential. An emergency shower must be readily accessible to the work area. Consideration must be given both to durability as well as permeation resistance.

**Work Practice Controls:**

Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:

- (1) Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
- (2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.
- (3) Wash exposed skin promptly to remove accidental splashes of contact with this material.

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product

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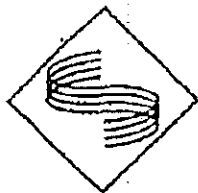
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Information phone number in Section 1 for its exact specifications.

**Physical Appearance:**

colorless oily liquid.

**Odor:**

odorless.

**pH:**

1 at 1 wt/wt%.

**Specific Gravity:**

Not Available

**Density:**

1.6 to 1.8 g/ml at 25 C (77 F).

**Water Solubility:**

miscible

**Melting Point Range:**

Not Available

**Freezing Point Range:**

-36 to -28 C (-33 to -18 F)

**Boiling Point Range:**

151 to 276 C (304 to 529 F) at 760 mmHg

**Vapor Pressure:**

1 to 0 mmHg at 40 C (104 F)

**Vapor Density:**

3.4

**Molecular Weight:**

98.08

**Chemical Stability:**

This material is stable under normal handling and storage conditions described in Section 7.

**Conditions To Be Avoided:**

none known

**Materials/Chemicals To Be Avoided:**

water

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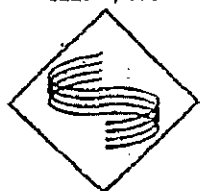
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**Manufacturer's Safety Data Sheet**  
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SHRIEVE CHEMICAL COMPANY  
GENERAL MSDS ASSISTANCE 800-367-4226  
TECHNICAL MSDS ASSISTANCE 281-292-2014 ext. 111  
281-292-2014 ext. 133

strong reducing agents  
halogens  
bases  
metals  
nitrogen compounds

**Decomposition Temperature Range:**  
340 C (644 F)

**The Following Hazardous Decomposition Products Might Be Expected:**

**Decomposition Type:** thermal  
oxides of sulfur

**Hazardous Polymerization Will Not Occur.**

**Avoid The Following To Inhibit Hazardous Polymerization:**  
not applicable

**Acute Eye Irritation:**

**Toxicological Information and Interpretation:**

eye - eye irritation, 250 ug/24 hr, rabbit. Severely irritating.

**Acute Skin Irritation:**

No test data found for product. This product was not tested because strong acids are known to be corrosive and to cause severe tissue destruction.

**Acute Dermal Toxicity:**

No test data found for product. This product was not tested because strong acids are known to be corrosive and to cause severe tissue destruction.

**Acute Respiratory Irritation:**

**Toxicological Information and Interpretation:**

lung - lung irritation, < 5 mg/cu m, human. Mildly irritating.

**Acute Inhalation Toxicity:**

**Toxicological Information and Interpretation:**

LC50 - lethal concentration 50% of test species, 510 mg/cu m/2 hr, rat.

LC50 - lethal concentration 50% of test species, 347 ppm/1 hr, rat.

**Acute Oral Toxicity:**

**Toxicological Information and Interpretation:**

LD50 - lethal dose 50% of test species, 2140 mg/kg, rat.

**Chronic Toxicity:**

This product contains the substances that are considered to be "probable" or "suspected" human carcinogens as follows:

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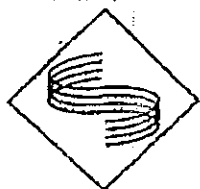
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KEITH CARLSON BRENTAG TO FAX#1-903-759-

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## Shrieve Chemical Company Manufacturer's Safety Data Sheet

CHEMTREC

800-424-9300

24-HOUR EMERGENCY ASSISTANCE

800-367-4226

SHRIEVE CHEMICAL COMPANY

800-367-4226

GENERAL MSDS ASSISTANCE

281-367-4226 ext.111

TECHNICAL MSDS ASSISTANCE

281-367-4226 ext.133

**Ingredient Name**

SULFURIC ACID

OCCUPATIONAL EXPOSURES TO STRONG-INORGANIC-AC ID  
MISTS CONTAINING**Regulatory Agency Listing Carcinogen**

OSHA	IARC	NTP	ACGIH
No	No	No	A2
No	1	No	A2

The International Agency for Research on cancer (IARC) has classified strong inorganic acid mists containing sulfuric acid as a known human carcinogen (IARC Category 1). This classification applies only to sulfuric acid when it is generated as a mist. There is still debate in the scientific community whether the studies reviewed by IARC adequately controlled for confounding occupational exposures and personal habits such as cigarette smoking and alcohol consumption. A few epidemiology studies have suggested a possible association between sulfuric acid exposure and laryngeal or lung cancer; however, in all these studies, workers were exposed to many other chemicals, some of which are recognized carcinogens, such as diethylsulfate and nickel. Considering the multiple chemical exposures and other limitations of the studies, we disagree with IARC's conclusion that a cause and effect relationship between cancer and exposure to strong inorganic acid mist containing sulfuric acid has been demonstrated.

**Ecotoxicological Information:****Ecotoxicological Information and Interpretation:**

The toxicity of sulfuric acid to fish is dependent on the resulting pH of the water. Lethality at a pH of 5.0 or below, required to cause lethality varies depending on the hardness of the water (hard water has some buffering capacity) and the species of fish (some fish are more resistant to the effects of acidity). McKee, JE, and Wolf, HA (Editors), Water Quality Criteria, 2nd ed., Publication No. 3-A, p. 279, California State Water Resources Control Board, Sacramento, CA (rev. 1963).

**Chemical Fate Information:**

No data found for product.

**Waste Disposal Method:**

Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Please be advised that state and local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Consult state and local regulations regarding the proper disposal of this material.

**EPA Hazardous Waste - YES****EPA RCRA HAZARDOUS WASTE CODES:**

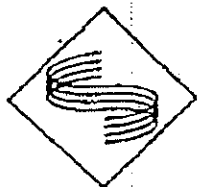
"C" Corrosive; "R" Reactive

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281-367-4226 ext.133

**Transportation Status: IMPORTANT!** Statements below provide additional data on listed DOT classification. The listed Transportation Classification does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors.

**US Department of Transportation**

Hazard Class..... 8

Shipping Name:

SULFURIC ACID

ID Number..... UN1830

Packing Group.... II

Labels..... CORROSIVE

Emergency Guide #.... 137

**Inventory Status****Inventory**

UNITED STATES (TSCA)

CANADA (DSL)

EUROPE (EINECS/ELINCS)

AUSTRALIA (AICS)

JAPAN (MITI)

SOUTH KOREA (KECL)

**Status**

Y

Y

Y

Y

Y

Y

Y = All ingredients are on the inventory.

E = All ingredients are on the inventory or exempt from listing.

P = One or more ingredients fall under the polymer exemption or are on the no longer polymer list. All other ingredients are on the inventory or exempt from listing.

N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing.

**FEDERAL REGULATIONS****Inventory Issues:**

All functional components of this product are listed on the TSCA Inventory.

**SARA Title III Hazard Classes:**

Fire Hazard

- NO

Reactive Hazard

- YES

Release of Pressure

- NO

Acute Health Hazard

- YES

Chronic Health Hazard

- NO

**SARA 313 Chemicals**

SULFURIC ACID (65 - 100%)

**SARA Extremely Hazardous Substances (EHS)/CERCLA Hazardous Substances**

Ingredient

SULFURIC ACID

CERCLA/SARA RQ

1000 lbs

SARA EHS TPO

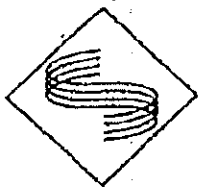
1000 lbs

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**Shrieve Chemical Company**  
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**CHEMTREC** 800-424-9300  
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UNLISTED HAZARDOUS WASTES - CHARACTERISTIC OF CORROSIVITY 100 lbs

UNLISTED HAZARDOUS WASTES - CHARACTERISTIC OF REACTIVITY 100 lbs

**STATE REGULATIONS:**

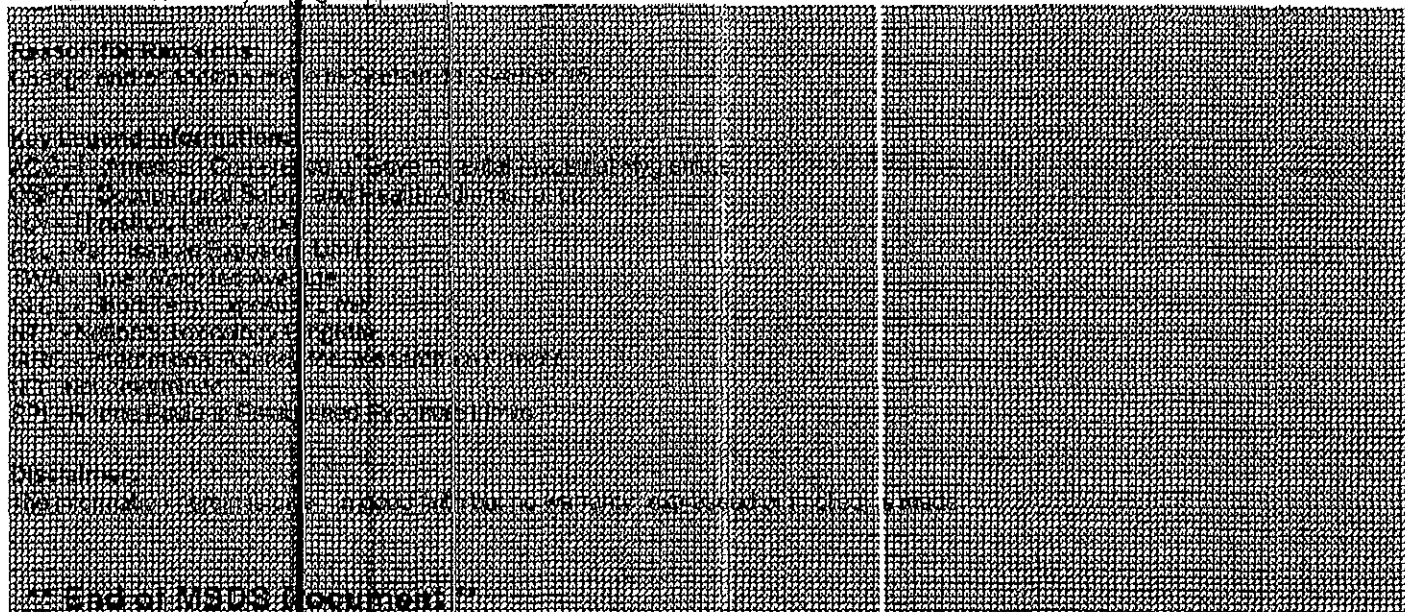
This product does not contain any components that are regulated under California Proposition 65.

**National Fire Protection Association Hazard Ratings--NFPA(R):**

- 3 Health Hazard Rating--Serious
- 0 Flammability Rating--Minimal
- 2 Instability Rating--Moderate
- 0 \*NO WATER

**National Paint & Coating Hazardous Materials Identification System--HMIS(R):**

- 3 Health Hazard Rating--Serious
- 0 Flammability Rating--Minimal
- 2 Reactivity Rating--Moderate



# MATERIAL SAFETY DATA SHEET

## SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: SODIUM PHOSPHATE TRIBASIC, DODECAHYDRATE  
PRODUCT DESCRIPTION:  
DATE PREPARED: 15 April 1989

EMERGENCY PHONE - 24 HOURS: CALL CHEM-TEL, INC. (800) 255-3824

## SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	WT. %	OSHA PEL	ACGIH TLV	CAS REGISTRY#
SODIUM PHOSPHATE TRIBASIC, DODECAHYDRATE				10101-88-0

## SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: CORROSIVE! CAUSES BURNS.

### POTENTIAL HEALTH EFFECTS

INHALATION: HARMFUL IF SWALLOWED. MATERIAL IS EXTREMELY DESTRUCTIVE TO TISSUE OF THE MUCOUS MEMBRANE AND UPPER RESPIRATORY TRACT.  
EYE CONTACT: HARMFUL. CAUSES BURNS. MATERIAL IS EXTREMELY DESTRUCTIVE.  
SKIN CONTACT: HARMFUL WHEN ABSORBED THROUGH SKIN.  
INGESTION: HARMFUL IF SWALLOWED. MATERIAL EXTREMELY DESTRUCTIVE.  
CHRONIC: N/A

- IN ALL CASES CONTACT PHYSICIAN.

HMIS HAZARD CODE: HEALTH: FLAMMABILITY:0 REACTIVITY:

## SECTION 4 FIRST AID MEASURES

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. SEEK MEDICAL ADVICE.  
EYE CONTACT: IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. CALL A PHYSICIAN.  
SKIN CONTACT: IMMEDIATELY FLUSH SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CONTAMINATED CLOTHES BEFORE REUSE.  
INGESTION: IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.

## SECTION 5 FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: N/A)  
FLAMMABLE LIMITS: LFL.....N/A UFL.....N/A  
LEL.....N/A UEL.....N/A

GENERAL HAZARD.....N/A

FIRE FIGHTING INSTRUCTIONS.....  
FIRE FIGHTING EQUIPMENT.....

USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.  
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

HAZARDOUS COMBUSTION PRODUCTS.... EMITS TOXIC FUMES UNDER FIRE CONDITIONS.



## SECTION 6 ACCIDENTAL RELEASE MEASURES

**LAND SPILL:** WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES. SWEEP-UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL. AVOID RAISING DUST. VENTILATE AREA AND WASH AFFECTED SITE AFTER MATERIAL PICKUP IS COMPLETE.

**WATER SPILL:** N/A

## SECTION 7 HANDLING AND STORAGE

**STORAGE TEMPERATURE:** AMBIENT  
**STORAGE PRESSURE:** ATMOSPHERIC  
**GENERAL:** WASH THOROUGHLY AFTER HANDLING. KEEP TIGHTLY CLOSED. STORE IN A COOL DRY PLACE.

## SECTION 8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

**ENGINEERING CONTROLS**  
VENTILATION: MECHANICAL

**PERSONAL PROTECTION**  
RESPIRATOR: WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.  
PROTECTIVE CLOTHING: CHEMICAL RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

<b>VAPOR PRESSURE:</b>	TO WATER	<b>VAPOR DENSITY:</b>	TO WATER
<b>SPECIFIC GRAVITY.....:</b>	1.620	(air=1)	
<b>SOLUBILITY IN WATER.....:</b>	N/A	<b>EVAPORATION RATE.....:</b>	TO WATER
<b>pH.....:</b>	N/A	(n-Butyl Acetate=1)	
<b>BOILING POINT.....:</b>	N/A	<b>FREEZING POINT.....:</b>	N/A
<b>VISCOSITY.....:</b>	N/A	<b>ODOR.....:</b>	N/A
<b>APPEARANCE.....:</b>	WHITE CRYSTALS		
<b>PHYSICAL STATE.....:</b>	N/A		

## SECTION 10 STABILITY AND REACTIVITY

**GENERAL:** N/A  
**INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:** STRONG ACIDS.  
**HAZARDOUS DECOMPOSITION:** NATURE OF DECOMPOSITION PRODUCTS NOT KNOWN.

## SECTION 11 TOXICOLOGICAL INFORMATION

**ACUTE EFFECTS:** HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MATERIAL IS EXTREMELY DESTRUCTIVE TO TISSUE OF THE MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT, EYES AND SKIN. INHALATION MAY BE FATAL AS A RESULT OF SPASM, INFLAMMATION AND EDEMA SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING, WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND VOMITING. TO THE BEST OF OUR KNOWLEDGE THE CHEMICAL, PHYSICAL AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY TESTED.

## SECTION 12 ECOLOGICAL INFORMATION

NO DATA AVAILABLE

## SECTION 13 DISPOSAL CONSIDERATIONS

FOR SMALL QUANTITIES: CAUTIOUSLY ADD TO A LARGE STIRRED EXCESS OF WATER. ADJUST THE PH TO NEUTRAL, SEPARATE ANY INSOLUBLE SOLIDS OR LIQUIDS AND PACKAGE THEM FOR HAZARDOUS WASTE DISPOSAL. FLUSH THE AQUEOUS SOLUTION DOWN THE DRAIN WITH PLENTY OF WATER. THE HYDROLYSIS AND NEUTRALIZATION REACTIONS REACTIONS MAY GENERATE HEAT AND FUMES WHICH CAN BE CONTROLLED BY THE RATE OF ADDITION. FOLLOW LOCAL, STATE AND FEDERAL REGULATIONS.

## SECTION 14 TRANSPORT INFORMATION

DOT (Department Of Transportation)

PROPER SHIPPING NAME: N/A  
UN NUMBER: N/A  
HAZARD CLASS: N/A  
PACKING GROUP: N/A

EMERGENCY PHONE - 24 HOURS: CALL CHEM-TEL, INC. (800) 255-3924

## SECTION 15 REGULATORY INFORMATION

EUROPEAN INFORMATION: CAUTION: SUBSTANCE NOT YET FULLY TESTED. CORROSIVE. CAUSES BURNS. IN CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE. TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING. WEAR SUITABLE PROTECTIVE CLOTHING. DO NOT BREATHE DUST.

## SECTION 16 OTHER INFORMATION

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, ACS Chemical, Inc., makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, ACS Chemical, Inc., will not be responsible for damages of any kind resulting from the use of or reliance upon such information.

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DATE: 04/03/93 ACCT: 784500-08  
INDEX: 32861270046 CAT NO: S318500 PO NBR: N/A

PAGE: 1

\*\*SODIUM HYDROXIDE, DRY SOLID, FLAKE, BEAD, OR GRANULAR\*\*  
\*\*SODIUM HYDROXIDE, DRY SOLID, FLAKE, BEAD, OR GRANULAR\*\*  
\*\*SODIUM HYDROXIDE, DRY SOLID, FLAKE, BEAD, OR GRANULAR\*\*

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC  
CHEMICAL DIVISION  
1 REAGENT LANE  
FAIR LAWN NJ 07410  
(201) 796-7100

EMERGENCY NUMBER: (201) 796-7100  
CHEMTREC ASSISTANCE: (800) 424-9300

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 1310-73-2

SUBSTANCE: \*\*SODIUM HYDROXIDE, DRY SOLID, FLAKE, BEAD, OR GRANULAR\*\*

TRADE NAMES/SYNONYMS:

CAUSTIC SODA; SODA LYE; LYE; WHITE CAUSTIC; CAUSTIC SODA, BEAD;  
CAUSTIC SODA, DRY; CAUSTIC SODA, FLAKE; CAUSTIC SODA, GRANULAR;  
CAUSTIC SODA, SOLID; SODIUM HYDRATE; SODIUM HYDROXIDE (NA(OH));  
SODIUM HYDROXIDE, FLAKE; SODIUM HYDROXIDE, DRY; SODIUM HYDROXIDE, SOLID;  
ASCARITE; SODIUM HYDROXIDE; STCC 4935235; UN 1823;  
S-318; S-318; S-320; S-612; BP359; NAOH; ACC21300

CHEMICAL FAMILY:  
INORGANIC BASE

MOLECULAR FORMULA: NA-O-H

MOLECULAR WEIGHT: 40.00

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=1 PERSISTENCE=0  
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=1

COMPONENTS AND CONTAMINANTS

COMPONENT: SODIUM HYDROXIDE PERCENT: 100  
CAS# 1310-73-2

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:  
SODIUM HYDROXIDE:

2 MG/M3 OSHA CEILING  
2 MG/M3 ACGIH CEILING  
2 MG/M3 NIOSH RECOMMENDED CEILING  
2 MG/M3 DFG MAK TWA (TOTAL DUST)  
4 MG/M3 DFG MAK 5 MINUTE PEAK, MOMENTARY VALUE, 8 TIMES/SHIFT

MEASUREMENT METHOD: PARTICULATE FILTER; HYDROCHLORIC ACID; TITRATION;  
(NIOSH VOL. III # 7401, ALKALINE DUSTS).

1000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY

\*\*OSHA LIMITS ADOPTED JANUARY 19, 1989 ARE SUBJECT TO THE DECISION OF THE  
TENTH CIRCUIT COURT OF APPEALS (AFL-CIO V. OSHA) AS OF JULY 7, 1992.\*\*

PHYSICAL DATA

DESCRIPTION: ODORLESS, WHITE OR OFF-WHITE HYGROSCOPIC SOLID.

BOILING POINT: 2534 F (1390 C) MELTING POINT: 604 F (318 C)

SPECIFIC GRAVITY: 2.130 VAPOR PRESSURE: 100 MMHG @ 1111 C

PH: 14 @ 5% SOLUTION SOLUBILITY IN WATER: 111 %

SOLVENT SOLUBILITY: SOLUBLE IN ALCOHOL, GLYCEROL; INSOLUBLE ACETONE, ETHER.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:  
NEGLECTIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:  
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM

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(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM  
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:

MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 60).

USE AGENT SUITABLE FOR TYPE OF FIRE. USE WATER IN FLOODING QUANTITIES AS FOG. APPLY WATER FROM AS FAR A DISTANCE AS POSSIBLE.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49-CFR 172.101:  
CORROSIVE MATERIAL

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49-CFR 172.101 AND  
SUBPART E:  
CORROSIVE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49-CFR 173.245B  
EXCEPTIONS: 49-CFR 173.244

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180).  
DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204.  
EFFECTIVE DATE OCTOBER 1, 1991, HOWEVER, COMPLIANCE WITH THE REGULATIONS IS  
AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE  
EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO  
OCTOBER 1, 1993. (56 FR 47158, 09/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:  
SODIUM HYDROXIDE, SOLID-UN 1823

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:  
8 - CORROSIVE MATERIAL

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:  
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101  
AND SUBPART E:  
CORROSIVE

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:  
EXCEPTIONS: 49 CFR 173.154  
NON-BULK PACKAGING: 49 CFR 173.212  
BULK PACKAGING: 49 CFR 173.240

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:  
PASSENGER AIRCRAFT OR RAILCAR: 15 KG  
CARGO AIRCRAFT ONLY: 50 KG

TOXICITY

SODIUM HYDROXIDE:

IRRITATION DATA: 500 MG/24 HOURS SKIN-RABBIT SEVERE; 1% EYE-RABBIT SEVERE;  
50 UG/24 HOURS EYE-RABBIT SEVERE; 1 MG/24 HOURS EYE-RABBIT SEVERE; 400 UG  
EYE-RABBIT MILD; 1 MG/30 SECONDS RINSED EYE-RABBIT SEVERE; 1%/24 HOURS  
EYE-MONKEY SEVERE

TOXICITY DATA: 1350 MG/KG SKIN-RABBIT LD50 (VAN WATERS & ROGERS INC. MSDS);  
500 MG/KG ORAL-RABBIT LD50; 104-340 MG/KG ORAL-RAT LD50 (VAN WATERS & ROGERS  
INC. MSDS); 40 MG/KG INTRAPERITONEAL-MOUSE LD50; MUTAGENIC DATA (RTECS).

CARCINOGEN STATUS: NONE

LOCAL EFFECTS: CORROSIVE- INHALATION, SKIN, EYE, INGESTION.  
ACUTE TOXICITY LEVEL: TOXIC BY INGESTION; MODERATELY TOXIC BY DERMAL  
ABSORPTION.

TARGET EFFECTS: NO DATA AVAILABLE.  
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH PRE-EXISTING SKIN AND EYE  
CONDITIONS.

HEALTH EFFECTS AND FIRST AID

INHALATION:

SODIUM HYDROXIDE:

CORROSIVE. 250 MG/M3 IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.

ACUTE EXPOSURE- EFFECTS DUE TO INHALATION OF DUSTS OR MIST MAY VARY FROM  
MILD IRRITATION OF THE NOSE AT 2 MG/M3 TO SEVERE PNEUMONITIS DEPENDING  
ON THE SEVERITY OF EXPOSURE. LOW CONCENTRATIONS MAY CAUSE MUCOUS MEMBRANE  
IRRITATION WITH SORE THROAT, COUGHING, AND DYSPNEA. INTENSE EXPOSURES MAY  
RESULT IN DESTRUCTION OF MUCOUS MEMBRANES AND DELAYED PULMONARY EDEMA  
OR PNEUMONITIS. SHOCK MAY OCCUR.  
CHRONIC EXPOSURE- PROLONGED EXPOSURES TO HIGH CONCENTRATIONS OF DUSTS OR

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MISTS MAY CAUSE DISCOMFORT AND ULCERATION OF THE NASAL PASSAGES. REPEATED EXPOSURES OF 5000 MG/L WERE HARMLESS TO RATS, BUT 10,000 MG/L LED TO NERVOUSNESS, SORE EYES, DIARRHEA AND RETARDED GROWTH. RATS EXPOSED 30 MINUTES PER DAY TO UNMEASURED CONCENTRATIONS OF SODIUM HYDROXIDE AEROSOLS SUFFERED PULMONARY DAMAGE AFTER 2-3 MONTHS. DEATH OCCURRED IN 2 OF 10 RATS EXPOSED TO AN AEROSOL OF 40% AQUEOUS SODIUM HYDROXIDE FOR 30 MINUTES TWICE A WEEK FOR 3 WEEKS. HISTOPATHOLOGICAL EXAMINATION SHOWED MOSTLY NORMAL LUNG TISSUE WITH FOCI OF ENLARGED ALVEOLAR SEPTAE, EMPHYSEMA, BRONCHIAL ULCERATION, AND ENLARGED LYMPH ADENOIDAL TISSUES. AN EPIDEMIOLOGIC STUDY OF 291 WORKERS CHRONICALLY EXPOSED TO CAUSTIC DUSTS FOR 30 YEARS OR MORE FOUND NO SIGNIFICANT INCREASE IN MORTALITY IN RELATION TO DURATION OR INTENSITY OF SUCH EXPOSURES.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:  
SODIUM HYDROXIDE:  
CORROSIVE

ACUTE EXPOSURE- UPON CONTACT WITH THE SKIN, DAMAGE INCLUDING REDNESS, CUTANEOUS BURNS, SKIN FISSURES AND WHITE ESCHARS MAY OCCUR WITHOUT IMMEDIATE PAIN. EXPOSURE TO SOLUTIONS AS WEAK AS 0.03 N (0.12%) FOR 1 HOUR HAS CAUSED INJURY TO HEALTHY SKIN. SOLUTIONS OF 25-50% CAUSED NO SENSATION OF IRRITATION WITHIN 3 MINUTES IN HUMAN SUBJECTS. WITH SOLUTIONS OF 0.4-4%, IRRITATION DOES NOT OCCUR UNTIL AFTER SEVERAL HOURS. SKIN BIOPSIES FROM HUMAN SUBJECTS HAVING 1 N SODIUM HYDROXIDE APPLIED TO THEIR ARMS FOR 15 TO 180 MINUTES SHOWED PROGRESSIVE CHANGES BEGINNING WITH DISSOLUTION OF THE HORNY LAYER AND PROGRESSING THROUGH EDEMA TO TOTAL DESTRUCTION OF THE EPIDERMIS IN 60 MINUTES. A 5% AQUEOUS SOLUTION CAUSED SEVERE NECROSIS TO THE SKIN OF RABBITS WHEN APPLIED FOR 4 HOURS. ALKALIES PENETRATE THE SKIN SLOWLY. THE EXTENT OF INJURY DEPENDS ON THE DURATION OF CONTACT. IF SODIUM HYDROXIDE IS NOT REMOVED FROM THE SKIN, SEVERE BURNS WITH DEEP ULCERATION MAY OCCUR. EXPOSURE TO THE DUST OR MIST MAY CAUSE MULTIPLE SMALL BURNS AND TEMPORARY LOSS OF HAIR. PATHOLOGIC FINDINGS DUE TO ALKALIES MAY INCLUDE GELATINOUS, NECROTIC AREAS AT THE SITE OF CONTACT.

CHRONIC EXPOSURE- EFFECTS ARE DEPENDENT UPON CONCENTRATION AND DURATION OF EXPOSURE. DERMATITIS OR EFFECTS SIMILAR TO THOSE FOR ACUTE EXPOSURE MAY OCCUR.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING, BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:  
SODIUM HYDROXIDE:  
CORROSIVE

ACUTE EXPOSURE- CONTACT MAY CAUSE DISINTEGRATION AND SLOUGHING OF CONJUNCTIVAL AND CORNEAL EPITHELIUM. CORNEAL OPACIFICATION, MARKED EDEMA AND ULCERATION. AFTER 7 TO 13 DAYS EITHER GRADUAL RECOVERY BEGINS OR THERE IS PROGRESSION OF ULCERATION AND CORNEAL OPACIFICATION. COMPLICATIONS OF SEVERE EYE BURNS ARE SYMBLEPHARON WITH OVERGROWTH OF THE CORNEA BY A VASCULARIZED MEMBRANE, PROGRESSIVE OR RECURRENT CORNEAL ULCERATION AND PERMANENT CORNEAL OPACIFICATION. BLINDNESS MAY OCCUR.

CHRONIC EXPOSURE- EFFECTS ARE DEPENDENT UPON CONCENTRATION AND DURATION OF EXPOSURE. CONJUNCTIVITIS OR EFFECTS SIMILAR TO THOSE FOR ACUTE EXPOSURE MAY OCCUR.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER. OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). CONTINUE IRRIGATING WITH NORMAL SALINE UNTIL THE PH HAS RETURNED TO NORMAL (30-60 MINUTES). COVER WITH STERILE BANDAGES. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:  
SODIUM HYDROXIDE:  
CORROSIVE/TOXIC

ACUTE EXPOSURE- THE REPORTED LETHAL DOSE IN RATS IS 140-340 MG/KG. INGESTION MAY CAUSE A BURNING SENSATION IN THE MOUTH, CORROSION OF THE LIPS, MOUTH, TONGUE AND PHARYNX, AND SEVERE ESOPHAGEAL AND ABDOMINAL PAIN. VOMITING OF BLOOD AND LARGE PIECES OF MUCOSA, AND BLOODY DIARRHEA, ASPHYXIA CAN OCCUR FROM SWELLING OF THE THROAT. MEDIASTINITIS, ALKALEMIA, PALLOR, WEAK, SLOW PULSE, CARDIOVASCULAR COLLAPSE, SHOCK, COMA AND DEATH MAY OCCUR. PERFORATION OF THE ALIMENTARY TRACT AND CONSTRICTIVE SCARRING MAY RESULT. ESOPHAGEAL STRICTURE MAY OCCUR WEEKS, MONTHS, OR EVEN YEARS LATER TO MAKE SWALLOWING DIFFICULT. THE ESTIMATED FATAL DOSE IN MAN IS 5 GRAMS. CASES OF GLANDULAR CELL CARCINOMA OF THE ESOPHAGUS HAVE OCCURRED WITH LATENT PERIODS OF 12 TO 42 YEARS AFTER INGESTION. THESE CANCERS WERE BELIEVED TO BE SEQUELA OF TISSUE DESTRUCTION AND POSSIBLY SCAR FORMATION RATHER THAN THE RESULT OF DIRECT CARCINOGENIC ACTION OF SODIUM HYDROXIDE.

CHRONIC EXPOSURE- DEPENDING ON THE CONCENTRATION, REPEATED INGESTION OF ALKALINE SUBSTANCES MAY RESULT IN INFLAMMATORY AND ULCERATIVE EFFECTS ON THE ORAL MUCOUS MEMBRANES AND OTHER EFFECTS AS WITH ACUTE INGESTION.

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FIRST AID: DO NOT USE GASTRIC LAVAGE OR EMESIS. DILUTE THE ALKALI BY GIVING WATER OR MILK TO DRINK IMMEDIATELY AND ALLOWING VOMITING TO OCCUR. AS SOON AS POSSIBLE, HAVE QUALIFIED MEDICAL PERSONNEL DO ESOPHAGOSCOPY AND IRRIGATE INJURED AREAS WITH 1% ACETIC ACID UNTIL THE ALKALI IS COMPLETELY NEUTRALIZED. (DRESSBACH, HANDBOOK OF POISONING, 11TH EDITION). GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:  
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY

#### REACTIVITY

REACTIVITY:  
REACTS EXOTHERMICALLY WITH WATER.

INCOMPATIBILITIES:  
SODIUM HYDROXIDE:  
ACETALDEHYDE: MAY RESULT IN VIOLENT POLYMERIZATION.  
ACETIC ACID: MIXING IN CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.  
ACETIC ANHYDRIDE: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.  
ACIDS: MAY REACT VIOLENTLY.  
ACROLEIN: MAY RESULT IN AN EXTREMELY VIOLENT POLYMERIZATION.  
ACRYLONITRILE: MAY CAUSE VIOLENT POLYMERIZATION.  
ALLYL ALCOHOL + BENZENE SULFONYL CHLORIDE: POSSIBLE EXPLOSION HAZARD.  
ALLYL CHLORIDE: HYDROLYZES.  
ALUMINUM: VIGOROUS REACTION.  
ALUMINUM, ARSENIC TRIOXIDE, SODIUM ARSENATE: MAY GENERATE FLAMMABLE HYDROGEN GAS.  
AMMONIA + SILVER NITRATE: PRECIPITATION OF EXPLOSIVE SILVER NITRIDE MAY OCCUR.  
AMMONIUM SALTS: MAY REACT VIOLENTLY EVOLVING AMMONIA GAS.  
BENZENE-1,4-DIOL: EXOTHERMIC REACTION.  
N,N'-BIS(TRINITROETHYL)UREA: FORMATION OF EXPLOSIVE COMPOUND.  
BROMINE: POSSIBLE EXPLOSION IF NOT STIRRED CONTINUOUSLY.  
CHLORINE TRIFLUORIDE: MAY CAUSE VIOLENT REACTION.  
CHLOROFORM + METHYL ALCOHOL: EXOTHERMIC REACTION.  
CHLOROHYDRIN: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.  
4-CHLORO-2-METHYLPHENOL: POSSIBLE IGNITION.  
CHLORONITROTOLUENES: POSSIBLE EXPLOSION.  
CHLOROPICRIN: MAY CAUSE VIOLENT REACTION.  
CHLOROSULFONIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.  
CINNAMALDEHYDE: EXOTHERMIC REACTION.  
COATINGS: MAY BE ATTACKED.  
COPPER: SOLUTIONS MAY SLOWLY CORRODE.  
CYANOGEN AZIDE: MAY FORM SODIUM 5-AZIDOTETRAZOLIDE, WHICH IS EXPLOSIVE IF ISOLATED.  
2,2-DICHLORO-3,3-DIMETHYLBUTANE: HAZARDOUS REACTION.  
1,2-DICHLOROETHYLENE: MAY FORM SPONTANEOUSLY FLAMMABLE MONOCHLOROACETYLENE.  
DIBORANE AND OCTANAL OXIME: EXOTHERMIC REACTION.  
ETHYLENE CYANOHYDRIN: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.  
FLAMMABLE LIQUIDS: FIRE AND EXPLOSION HAZARD.  
GLYCOLS: MAY CAUSE EXOTHERMIC DECOMPOSITION WITH EVOLUTION OF HYDROGEN GAS.  
GLYOXAL: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.  
HALOGENATED HYDROCARBONS: VIOLENT REACTION.  
HYDROCHLORIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.  
HYDROFLUORIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.  
HYDROQUINONE: RAPID DECOMPOSITION OF HYDROQUINONE WITH EVOLUTION OF HEAT.  
IRON: SOLUTIONS MAY SLOWLY CORRODE.  
LEAD: MAY BE ATTACKED. FLAMMABLE HYDROGEN GAS MAY BE LIBERATED.  
LEATHER: MAY BE ATTACKED.  
MALEIC ANHYDRIDE: EXPLOSIVE DECOMPOSITION.  
METALS: CORRODES METALS, REACTING TO FORM FLAMMABLE HYDROGEN GAS.  
4-METHYL-2-NITROPHENOL: EXOTHERMIC REACTION.  
NITRIC ACID: MIXING IN CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.  
NITROBENZENE: POSSIBLY EXPLOSIVE REACTION UPON HEATING IN PRESENCE OF WATER.  
NITROETHANE: FORMS AN EXPLOSIVE SALT.  
NITROMETHANE: FORMS AN EXPLOSIVE SALT.  
NITROPARAFFINS: THE NITROPARAFFINS, IN THE PRESENCE OF WATER, FORM DRY SALTS WITH ORGANIC BASES. THE DRY SALTS ARE EXPLOSIVE.  
NITROPROPANE: FORMS AN EXPLOSIVE SALT.  
O-NITROTOLUENE: POSSIBLE EXPLOSION.  
OLEUM: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.  
ORGANIC PEROXIDES: INCOMPATIBLE.  
PENTOL (3-METHYL-2-PENTENE-4-YN-1-OL): POSSIBLE EXPLOSION.  
PHOSPHORUS: MAY FORM MIXED PHOSPHINES WHICH MAY IGNITE SPONTANEOUSLY IN AIR.  
PHOSPHORUS PENTOXIDE: MAY REACT VIOLENTLY WHEN HEATED.  
PLASTICS: MAY BE ATTACKED.  
B-PROPIOLACTONE: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.  
PROPYLENE OXIDE: IGNITION OR EXPLOSION MAY OCCUR.

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RUBBER: MAY BE ATTACKED.  
SODIUM TETRAHYDROBORATE: DRY MIXTURES WITH SODIUM HYDROXIDE CONTAINING 15-40% OF TETRAHYDROBORATE LIBERATE HYDROGEN EXPLOSIVELY AT 230-270 C.  
SULFURIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.  
1,2,4,5-TETRACHLOROBENZENE: VIOLENT REACTION.  
TETRACHLOROBENZENE + METHYL ALCOHOL: POSSIBLE EXPLOSION.  
TETRACHLOROETHYLENE: POSSIBLE EXPLOSION.  
TETRAHYDROFURAN: SERIOUS EXPLOSIONS CAN OCCUR.  
TIN: EVOLUTION OF HYDROGEN GAS WHICH MAY FORM AN EXPLOSIVE MIXTURE.  
1,1,1-TRICHLOROETHANOL: EXPLOSION MAY OCCUR.  
TRICHLOROETHYLENE: FORMATION OF EXPLOSIVE MIXTURES OF DICHLOROACETYLENE.  
TRICHLORONITROMETHANE + METHANOL: MAY CAUSE VIOLENT REACTION.  
WOOL: MAY BE ATTACKED.  
ZINC (DUST): FIRE AND EXPLOSION HAZARD.  
ZIRCONIUM: MAY CAUSE EXPLOSIVE REACTION UPON HEATING.

DECOMPOSITION:  
THERMAL DECOMPOSITION MAY RELEASE TOXIC FUMES OF SODIUM OXIDE.

POLYMERIZATION:  
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

#### STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

#### \*\*STORAGE\*\*

STORE IN A COOL, DRY, WELL-VENTILATED LOCATION. SEPARATE FROM ACIDS, WATER, METALS. IMMEDIATELY REMOVE AND PROPERLY DISPOSE OF ANY SPILLED MATERIAL. (NFPA 49, HAZARDOUS CHEMICALS DATA, 1991)

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

#### \*\*DISPOSAL\*\*

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262, EPA HAZARDOUS WASTE NUMBER D002, 100 POUND CERCLA SECTION 103 REPORTABLE QUANTITY.

#### CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. FLAMMABLE. POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. MAY IGNITE COMBUSTIBLES (WOOD, PAPER, OIL, ETC.).

#### SPILL AND LEAK PROCEDURES

SOIL SPILL:  
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

USE PROTECTIVE COVER SUCH AS A PLASTIC SHEET TO PREVENT MATERIAL FROM DISSOLVING IN FIRE EXTINGUISHING WATER OR RAIN.

WATER SPILL:  
ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:  
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

REPORTABLE QUANTITY (RQ): 1000 POUNDS  
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

#### PROTECTIVE EQUIPMENT

VENTILATION:  
PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:

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THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS, NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910, SUBPART Z.  
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

#### SODIUM HYDROXIDE:

50 MG/M3- ANY POWERED AIR-PURIFYING RESPIRATOR WITH A DUST AND MIST FILTER.  
ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.

100 MG/M3- ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.  
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.  
ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH EFFICIENCY PARTICULATE FILTER.

250 MG/M3- ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH EFFICIENCY PARTICULATE FILTER.  
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:  
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:  
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:  
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:  
WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC, INC.  
CREATION DATE: 12/17/84 REVISION DATE: 12/28/92

-ADDITIONAL INFORMATION-  
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Thursday, July 18, 2002

**OxyChem®****MATERIAL SAFETY DATA SHEET**

Revised

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

MSDS NUMBER : M32415 ISSUE DATE : 07-30-01

PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

Manufacturer's Name and Address : Occidental Chemical Corporation, Occidental Tower  
5065 LBJ Freeway, P.O. Box 809050  
Dallas, TX 75380 (972) 404-3800

24 HOUR EMERGENCY TELEPHONE : 1-800-733-3665 OR 972-404-3228

TO REQUEST AN MSDS : 1-800-699-4970

CUSTOMER SERVICE : 1-800-752-5151

PRODUCT USE : Metal finishing, industrial cleaners, chemical processing, petroleum industry

CHEMICAL NAME : Sodium hydroxide

CHEMICAL FORMULA : NaOH

SYNONYMS / COMMON NAMES : Sodium hydroxide solution

Revised

**2. COMPOSITION / INFORMATION ON INGREDIENTS**CAS NUMBER / NAME  
7732-18-9 Water**EXPOSURE LIMITS**PEL: Not Established  
TLV: Not Established  
PEL22: Not Established**PERCENTAGE**VOL ND  
WT 48.5-94.5COMMON NAMES:  
(MW 18.02)

Listed On (List Legend Below):

00 19 22 23 51



Occidental Chemical Corporation

Thursday, July 19, 2002 CHEMICAL CORPORATION

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MSDS NUMBER : 232415

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PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

**2. COMPOSITION/INFORMATION ON INGREDIENTS (Continued)**

1310-73-2 Sodium hydroxide (Na(OH))

**EXPOSURE LIMITS**

PEL: 2 MG/M3 CEIL

TLV: 2 MG/M3 CEIL

PELZ2: Not Established

**PERCENTAGE**

VOL

ND

WT

5.5-51.5

**COMMON NAMES:**

CAUSTIC SODA (MW 40.00)

Listed On (List Legend Below):

00 12 13 21 22 51 56 57

7647-14-5 Sodium chloride (NaCl)

**EXPOSURE LIMITS**

PEL: Not Established

TLV: Not Established

PELZ2: Not Established

**PERCENTAGE**

VOL

ND

WT

0-1.3

**COMMON NAMES:**

Salt (MW 58.44)

Listed On (List Legend Below):

00 22 23 51

**LIST LEGEND**

00 TSCA INVENTORY

13 PA ENVIRONMENTAL HAZ SUBSTANCE

21 NJ SPECIAL HEALTH HAZ SUB

23 NJ REQUIREMENT- 1% OR GREATER

56 OSHA PERMISSIBLE EXPOSURE LIM.

12 PA HAZARDOUS SUBSTANCE

19 PA REQUIREMENT- 3% OR GREATER

22 CANADIAN DOMESTIC SUB LIST

51 EINECS

57 ACGIH THRESHOLD LIMIT VALUES

Revised

**3. HAZARDS IDENTIFICATION**

\*\*\*\*\* EMERGENCY OVERVIEW \*\*\*\*\*

\* MAY CAUSE BURNS TO THE EYES, SKIN, RESPIRATORY AND

\* GASTROINTESTINAL TRACT. MAY CAUSE PERMANENT EYE DAMAGE.

\* Clear liquid with no distinct odor

\*\*\*\*\*

**POTENTIAL HEALTH EFFECTS****ROUTES OF ENTRY:**

Inhalation, Ingestion

**TARGET ORGANS:**

Eyes, Skin, Respiratory Tract, Gastrointestinal Tract.

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ACCIDENTAL CHEMICAL CORPORATION

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PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

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**3. HAZARDS IDENTIFICATION (Continued)**

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**IRRITANCY:**

All routes of exposure, Corrosive.

**SENSITIZING CAPABILITY:**

None known.

**REPRODUCTIVE EFFECTS:**

None known.

**CANCER INFORMATION:**

Not classified as carcinogenic by NTP, IARC, OSHA, ACGIH, or NIOSH.

**SHORT-TERM EXPOSURE (ACUTE)****INHALATION:**

Exposure can produce burns.

**EYES:**

Corrosive

Contact may cause burns and tissue destruction.

The severity of the effects depend on concentration and how soon after exposure the area is washed.

**MAY CAUSE PERMANENT EYE DAMAGE.****SKIN:**

Corrosive

Contact may cause burns and tissue destruction.

May cause burns that are not immediately noticed or painful.

**INGESTION:**

Corrosive

Contact may cause burns and tissue destruction.

**REPEATED EXPOSURE (CHRONIC)**

None known.

**SYNERGISTIC MATERIALS:**

None known.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:**

None known.



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PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

Revised

**4. FIRST AID MEASURES****EYES:**

Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

**SKIN:**

Immediately flush contaminated areas with water. Remove contaminated clothing and footwear. Wash contaminated areas with plenty of soap and water. Wash clothing before reuse. Discard footwear which cannot be decontaminated. GET MEDICAL ATTENTION IMMEDIATELY.

**INHALATION:**

Remove to fresh air if safe to transport. Otherwise attempt to provide fresh air by ventilation. If breathing is difficult, have a trained person administer oxygen. If respiration or pulse has stopped, have a trained person administer Basic Life Support (Cardio-Pulmonary Resuscitation/Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY (911 or emergency transport services).

**INGESTION:**

Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. (If available, give several glasses of milk.) If vomiting occurs spontaneously, keep airway clear and give more water. GET MEDICAL ATTENTION IMMEDIATELY.

**NOTES TO PHYSICIAN:**

No specialized procedures. Treat for clinical symptoms.

Revised

**5. FIRE FIGHTING MEASURES**

Flash Point: Not applicable

Method: Not applicable

Autoignition Temperature: Not applicable

**FLAMMABLE LIMITS IN AIR BY % VOLUME**

Upper: Not applicable

Lower: Not applicable

**EXTINGUISHING MEDIA**

Non-flammable / Non-combustible.

Use agents appropriate for surrounding fire.

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**5. FIRE FIGHTING MEASURES (Continued)**

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**FIRE FIGHTING PROCEDURES:**

Wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus and full protective clothing.

**FIRE AND EXPLOSION HAZARD:**

None known.

**SENSITIVITY TO MECHANICAL IMPACT:**

Not sensitive.

**SENSITIVITY TO STATIC DISCHARGE:**

Not sensitive.

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Revised:

**6. ACCIDENTAL RELEASE MEASURES**

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**PERSONAL PRECAUTIONS:**

Follow protective measures provided under Personal Protection in Section 8.

Evacuate unnecessary personnel and eliminate all sources of ignition.

**ENVIRONMENTAL PRECAUTIONS:**

Do not allow entry into sewers and waterways.

**METHODS FOR CLEANING UP:**

For small spills, soak up with absorbent material and place in properly labeled containers for disposal.

For large spills, dike and pump into properly labeled containers for reclamation or disposal.

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Revised:

**7. HANDLING AND STORAGE**

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**HANDLING:**

Use with adequate ventilation.

Avoid breathing vapors.

Wear personal protective equipment as described in Exposure Controls/Personal Protection (Section 8) of the MSDS.

**SPECIAL MIXING AND HANDLING INSTRUCTIONS:**

Do not allow contact with materials as noted in Section 10.

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## 7. HANDLING AND STORAGE (Continued)

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### STORAGE:

Keep container tightly closed and properly labeled.

Do not store in aluminum container or use aluminum fittings or transfer lines, as flammable hydrogen gas can be generated.

Revised

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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### ENGINEERING CONTROLS:

Handle product in a well ventilated area.

If product is handled in an open system, the use of process enclosures, local exhaust ventilation, and/or other engineering controls should be considered to control airborne levels to below recommended exposure limits, or below acceptable levels where there are no limits.

### PERSONAL PROTECTION

#### RESPIRATORY:

A NIOSH approved respirator with a dust, fume and mist filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure.

A respiratory protection program that meets 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant use of a respirator.

#### EYE/FACE:

Wear chemical safety goggles plus full face shield to protect against contact when appropriate (ANSI Z87.1).

#### SKIN:

Wear protective clothing to minimize skin contact.

Wear chemical resistant gloves such as rubber, neoprene or vinyl.

#### OTHER:

Discard leather items that cannot be decontaminated.

Emergency shower and eyewash facility should be in close proximity (ANSI Z358.1).

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CENTAL CHEMICAL CORPORATION  
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Revised:

## 9. PHYSICAL AND CHEMICAL PROPERTIES

	Concentration, weight %				
Physical State: Liquid:	10	20	30	40	50
Boiling Pt @ 760 mm Hg, °C:	110	113	119	129	144
Freezing Pt °C:	-10	-32	0	15	12
Vapor Press., mm Hg @ 60°C:	135	110	76	46	13
Spec. Grav. @ 15.6°C:	1.11	1.22	1.33	1.43	1.53
Density, lb/gal @ 15.6 C:	9.27	10.20	11.11	11.97	12.76
Sol. in H <sub>2</sub> O, % by Wt.:	100				
Vapor Density:	Not applicable				
Odor Threshold (ppm):	Not determined				
Evaporation Rate:	Not determined				
Coefficient Water/Oil Distribution:	Not applicable				
pH:	7.5% solution has pH 14.0				

Appearance and Odor: Clear liquid with no distinct odor

Revised:

## 10. STABILITY AND REACTIVITY

## CHEMICAL STABILITY:

☒ STABLE ☐ UNSTABLE

## REACTS WITH:

<input checked="" type="checkbox"/> AIR	<input type="checkbox"/> OXIDIZERS	<input checked="" type="checkbox"/> METALS
<input type="checkbox"/> WATER	<input checked="" type="checkbox"/> ACIDS	<input checked="" type="checkbox"/> OTHER
<input type="checkbox"/> HEAT	<input type="checkbox"/> ALKALIS	<input type="checkbox"/> NONE

## HAZARDOUS POLYMERIZATION:

☐ OCCURS ☒ WILL NOT OCCUR

## COMMENTS:

Product is corrosive to tin, aluminum, zinc and alloys containing these metals and will react with these metals in powder form. Avoid contact with leather, wool, acids, organic halogen compounds, or organic nitro compounds. Hazardous carbon monoxide gas can form upon contact with reducing sugars, food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures.

Prolonged contact with aluminum may produce flammable hydrogen gas.

## HAZARDOUS DECOMPOSITION PRODUCTS:

None.

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MSDS NUMBER : 132415

07-30-01

PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

Revised

**11. TOXICOLOGICAL INFORMATION**

1310-73-2 Sodium hydroxide (Na(OH))

This substance is alkaline and corrosive. Minimize contact. The irritating and corrosive properties of this substance depend on its concentration. It is toxic by the oral route. It may cause burns and other effects to the mucous membranes, mouth and digestive tract. Its dermal toxicity has not been determined. It may cause burns that are not immediately noticed or painful. Inhalation of dust or vapors can cause airway effects including burns. This substance is irritating and corrosive to the eyes and skin.

The irritating and corrosive properties of this substance depend on its concentration. In general, serious injury is associated with products with a pH of 11.5 or higher.

For further information call or write the address shown on page 1 of the MSDS.

Revised

**12. ECOLOGICAL INFORMATION**

1310-73-2 Sodium hydroxide (Na(OH))

TOXICITY: This material is believed to be slightly toxic to aquatic life.

PERSISTENCE: This material is believed to be unlikely to persist in the environment.

BIOACCUMULATION: This material is believed to be unlikely to bioaccumulate.

For further information call or write the address shown on page 1 of the MSDS.

Revised

**13. DISPOSAL CONSIDERATIONS**

Dispose of all waste and contaminated equipment in accordance with all applicable federal, state and local health and environmental regulations.

Revised

**14. TRANSPORT INFORMATION**

DOT PROPER SHIPPING NAME: Sodium Hydroxide, solution

DOT HAZARD CLASS: 8

DOT IDENTIFICATION NO: UN1824

DOT PACKING GROUP: II

DOT HAZARDOUS SUBSTANCE: RQ 1,000 Lbs. (Sodium Hydroxide)

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MSDS NUMBER : M32415

07-30-01

PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

## 14. TRANSPORT INFORMATION (Continued)

DOT MARINE POLLUTANT(S): Not Applicable

ADDITIONAL DESCRIPTION REQUIREMENT: Not Applicable

Revised

## 15. REGULATORY INFORMATION

## U.S. FEDERAL REGULATIONS:

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

## TSCA:

All components of this product that are required to be on the TSCA inventory are listed on the inventory.

## SARA/TITLE III HAZARD CATEGORIES:

If the word "YES" appears next to any category, this product may be reportable by you under the requirements of 40 CFR 370. Please consult those regulations for details.

Immediate (Acute) Health:	<u>YES</u>	Reactive Hazard	<u>YES</u>
Delayed (Chronic) Health:	<u>NO</u>	Sudden Release of Pressure	<u>NO</u>
Fire Hazard:	<u>NO</u>		

## HMIS HAZARD RATINGS:

HEALTH HAZARD: 3 FIRE HAZARD: 0 REACTIVITY: 2

## STATE REGULATIONS:

See Section 2, COMPOSITION/INFORMATION ON INGREDIENTS list legend for applicable state regulation.

Consult local laws for applicability.

## INTERNATIONAL REGULATIONS:

Consult the regulations of the importing country.

## CANADA:

WHMIS Hazard Class: D1B, D2B, E

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PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

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16. OTHER INFORMATION

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For additional non-emergency health, safety or environmental information telephone (972) 404-2076 or write to:

Occidental Chemical Corporation  
Product Stewardship Department  
5005 LBJ Freeway  
P.O. Box 809050  
Dallas, Texas 75380

## MSDS LEGEND:

ACGIH - American Conference of Governmental Industrial Hygienists

CAS - Chemical Abstracts Service Registry Number

CEILING - Ceiling Limit (15 Minutes)

CEL - Corporate Exposure Limit

OSHA - Occupational Safety and Health Administration

PEL - Permissible Exposure Limit (OSHA)

STEL - Short Term Exposure Limit (15 Minutes)

TDG - Transportation of Dangerous Goods (Canada)

TLV - Threshold Limit Value (ACGIH)

TWA - Time Weighted Average (8 Hours)

WHMIS - Worker Hazardous Materials Information System (Canada)

\* - See Section 3 Hazards Identification - Repeated Exposure (Chronic) Information

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE, OR OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or violate any federal, state or local laws, rules, regulations or ordinances.

This Material Safety Data Sheet (MSDS) covers the following materials:

- CAUSTIC SODA LIQUID (ALL GRADES)
- 50% CAUSTIC SODA DIAPHRAGM GRADE
- 18% CAUSTIC SODA RAYON GRADE
- 20% CAUSTIC SODA RAYON GRADE
- 25% CAUSTIC SODA RAYON GRADE
- 30% CAUSTIC SODA RAYON GRADE
- 50% CAUSTIC SODA RAYON GRADE
- 50% CAUSTIC SODA RAYON GRADE OS

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CENTRAL CHEMICAL CORPORATION

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07-30-01

PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

**16. OTHER INFORMATION (Continued)**

- 50% CAUSTIC SODA MEMBRANE GRADE  
- 18% CAUSTIC SODA - DIAPHRAGM  
- 15% CAUSTIC SODA - DIAPHRAGM  
- 30% CAUSTIC SODA - DIAPHRAGM  
- 25% CAUSTIC SODA - DIAPHRAGM  
- 20% CAUSTIC SODA - DIAPHRAGM  
- 35% CAUSTIC SODA - DIAPHRAGM  
- 50% CAUSTIC SODA - DIAPHRAGM  
- 50% CAUSTIC SODA - DIAPHRAGM OS  
- 50% CAUSTIC SODA - PURIFIED  
- 50% CAUSTIC SODA - PURIFIED OS  
- 18% CAUSTIC SODA - MEMBRANE  
- CAUSTIC SODA LIQUID 70/30  
- 50% CAUSTIC SODA - MEMBRANE  
- 50% CAUSTIC SODA - MEMBRANE OS  
- 25% CAUSTIC SODA - MEMBRANE  
- 20% CAUSTIC SODA - MEMBRANE  
- 40% CAUSTIC SODA - DIAPHRAGM  
- 25% CAUSTIC SODA - MEMBRANE  
- 6% CAUSTIC SODA - MEMBRANE  
- 10% CAUSTIC SODA - DIAPHRAGM  
- 25% CAUSTIC SODA - DIAPHRAGM  
- MEMBRANE BLENDED  
- 48% CAUSTIC SODA - MEMBRANE

Revised

**17. WARNING LABEL INFORMATION****SIGNAL WORD:**

DANGER

**HAZARD WARNINGS:**

MAY CAUSE BURNS TO THE EYES, SKIN, RESPIRATORY AND GASTROINTESTINAL TRACT.

MAY CAUSE PERMANENT EYE DAMAGE.

**PRECAUTIONS:**

Avoid contact with eyes, skin and clothing.

Avoid breathing dust, vapors or mist.

Use with adequate ventilation.

Wash thoroughly after handling; exposure can cause burns which are not immediately painful or visible.

Keep container tightly closed and properly labeled.



Thursday, July 19, 2002  
Occidental Chemical Corporation

: M32415

PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

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17. WARNING LABEL INFORMATION (Continued)

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**FIRST AID****EYES:**

Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

**SKIN:**

Immediately flush contaminated areas with water. Remove contaminated clothing and footwear. Wash contaminated areas with plenty of soap and water. Wash clothing before reuse. Discard footwear which cannot be decontaminated. GET MEDICAL ATTENTION IMMEDIATELY.

**INHALATION:**

Remove to fresh air if safe to transport. Otherwise attempt to provide fresh air by ventilation. If breathing is difficult, have a trained person administer oxygen. If respiration or pulse has stopped, have a trained person administer Basic Life Support (Cardio-Pulmonary Resuscitation/Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY (911 or emergency transport services).

**INGESTION:**

Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. (If available, give several glasses of milk.) If vomiting occurs spontaneously, keep airway clear and give more water. GET MEDICAL ATTENTION IMMEDIATELY.

**IN CASE OF SPILL OR LEAK:**

Do not allow entry into sewers and waterways.

For small spills, soak up with absorbent material and place in properly labeled containers for disposal.

For large spills, dike and pump into properly labeled containers for reclamation or disposal.

**FIRE:**

Non-flammable / Non-combustible.

Use agents appropriate for surrounding fire.

**HANDLING AND STORAGE:**

Store in a cool, ventilated area away from incompatible materials (see Section 10).

**DISPOSAL:**

Dispose of all waste and contaminated equipment in accordance with all applicable federal, state and local health and environmental regulations.

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PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

**17. WARNING LABEL INFORMATION (Continued)****INFORMATION REQUIRED BY FEDERAL, STATE OR LOCAL REGULATIONS:****This Product Contains:**

CAS#	NAME
7732-18-5	Water
1310-73-2	Sodium hydroxide (Na(OH))
7647-14-5	Sodium chloride (NaCl)

HMIS RATING: HEALTH 3 FLAMMABILITY 0 REACTIVITY 2

LABEL NUMBER: 0701M32415

For Industrial Use Only

\*\*SULFURIC ACID\*\*

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\*\*SULFURIC ACID\*\*  
\*\*SULFURIC ACID\*\*  
\*\*SULFURIC ACID\*\*

-----  
MATERIAL SAFETY DATA SHEET  
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FISHER SCIENTIFIC  
CHEMICAL DIVISION  
1 REAGENT LANE  
FAIR LAWN NJ 07410  
(201) 796-7100

EMERGENCY CONTACTS:  
GASTON L. PILLORI: (201) 796-7100  
AFTER BUSINESS HOURS; HOLIDAYS:  
(201) 796-7523  
CHEMTREC ASSISTANCE: (800) 429-9300

DATE: 03/30/89  
PO NBR: C19344  
ACCT: 784500-06  
INDEX: 11890860457  
CAT NO: A300SI21

THE INFORMATION BELOW IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, WE MAKE NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION FOR THEIR PARTICULAR PURPOSES.

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SUBSTANCE IDENTIFICATION  
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SUBSTANCE: \*\*SULFURIC ACID\*\*

CAS-NUMBER 7664-93-9

TRADE NAMES/SYNONYMS:

OIL OF VITRIOL; BOV; DIPPING ACID; VITRIOL BROWN OIL; HYDROGEN SULFATE;  
NORHDADSEN ACID; DIHYDROGEN SULFATE; SULPHURIC ACID; MATTING ACID;  
DITHIONIC ACID; STCC 4930040; UN 1830; A-300; A-300C; A-300-SI; A-300S;  
A-298; A-510; A-468; SO-A-172; SO-A-174; ACC22350

CHEMICAL FAMILY:  
INORGANIC ACID

MOLECULAR FORMULA: H2-S-O4

MOLECULAR WEIGHT: 98.07

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=2 PERSISTENCE=0  
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=2

-----  
COMPONENTS AND CONTAMINANTS  
-----

COMPONENT: SULFURIC ACID

PERCENT: 98

COMPONENT: WATER

PERCENT: 2

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:  
SULFURIC ACID:

1 MG/M3 OSHA TWA  
1 MG/M3 ACGIH TWA (NOTICE OF INTENDED CHANGE 1987-1988)  
1 MG/M3 NIOSH RECOMMENDED 10 HOUR TWA

1000 POUNDS SARA SECTION 302 THRESHOLD PLANNING QUANTITY  
1000 POUNDS SARA SECTION 304 REPORTABLE QUANTITY  
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

-----  
PHYSICAL DATA  
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DESCRIPTION: ODORLESS, CLEAR, COLORLESS, DENSE HYGROSCOPIC OILY LIQUID WITH  
A MARKED ACID TASTE WHEN PURE. BOILING POINT: 559 F (290 C)

MELTING POINT: 50 F (10 C) SPECIFIC GRAVITY: 1.84

VAPOR PRESSURE: <0.001 @ 20 C PH: <3 SOLUBILITY IN WATER: SOLUBLE

ODOR THRESHOLD: >1 MG/M3 VAPOR DENSITY: 3.4

SOLVENT SOLUBILITY: DECOMPOSES IN ETHYL ALCOHOL

@ 340 C IT DECOMPOSES INTO SULFUR TRIOXIDE AND WATER

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FIRE AND EXPLOSION DATA  
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FIRE AND EXPLOSION HAZARD:  
NEGLECTIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

OXIDIZER: OXIDIZERS DECOMPOSE, ESPECIALLY WHEN HEATED, TO YIELD OXYGEN OR  
OTHER GASES WHICH WILL INCREASE THE BURNING RATE OF COMBUSTIBLE MATTER.  
CONTACT WITH EASILY OXIDIZABLE, ORGANIC, OR OTHER COMBUSTIBLE MATERIALS  
MAY RESULT IN IGNITION, VIOLENT COMBUSTION OR EXPLOSION.

FIREFIGHTING MEDIA:

DRY CHEMICAL, CARBON DIOXIDE OR HALON  
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, FLOOD AREA WITH WATER FROM A DISTANCE  
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

**FIREFIGHTING:**

DO NOT GET SOLID STREAM OF WATER ON SPILLED MATERIAL. MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. KEEP AWAY FROM STORAGE TANK ENDS (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4 GUIDE PAGE 39).

USE AGENT SUITABLE FOR TYPE OF FIRE; USE FLOODING AMOUNTS OF WATER AS A FOG. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS, KEEP UPWIND.

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**TRANSPORTATION DATA**

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:  
CORROSIVE MATERIAL

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND 172.402:  
CORROSIVE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49CFR173.272  
EXCEPTIONS: 49CFR173.244

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**TOXICITY**

**SULFURIC ACID:**

1380 UG EYE-RABBIT SEVERE IRRITATION; 100 MG EYE-RABBIT RINSED SEVERE IRRITATION; 3 MG/M3/24 WEEKS INHALATION-HUMAN TCLO; 510 MG/M3/2 HOURS INHALATION-RAT LC50; 320 MG/M3 2 HOURS INHALATION-MOUSE LC50; 18 MG/M3 INHALATION-GUINEA PIG LC50; 2140 MG/KG ORAL-RAT LD50; 135 MG/KG UNREPORTED-MAN LDLO; TUMORIGENIC DATA (AJEPAS 120(3), 358, 84).

CARCINOGEN STATUS: NONE.

SULFURIC ACID IS HIGHLY TOXIC, AND A SEVERE EYE, SKIN AND MUCOUS MEMBRANE IRRITANT. POISONING MAY AFFECT THE BODY'S PH BALANCE AND IN TURN AFFECT THE NERVOUS SYSTEM.

-----  
**HEALTH EFFECTS AND FIRST AID**

**INHALATION:**

**SULFURIC ACID:**

CORROSIVE/HIGHLY TOXIC. 80 MG/M3 IMMEDIATELY DANGEROUS TO LIFE OR HEALTH. ACUTE EXPOSURE- INHALATION OF MISTS MAY CAUSE MUCOUS MEMBRANE IRRITATION PRINCIPALLY AFFECTING THE RESPIRATORY TRACT EPITHELIUM. LOW CONCENTRATIONS, 0.35-5 MG/M3, MAY CAUSE INCREASED PULMONARY AIR FLOW RESISTANCE AND SUBSEQUENT SHALLOWER AND MORE RAPID BREATHING. HOT CONCENTRATED MISTS MAY CAUSE RAPID LOSS OF CONSCIOUSNESS WITH POSSIBLE DAMAGE TO LUNG TISSUE. VAPORS MAY CAUSE NASAL SECRETIONS, SNEEZING, A BURNING OR TICKLING SENSATION IN THE NOSE AND THROAT AND RETROSTERNAL REGION, FOLLOWED BY COUGH, RESPIRATORY DISTRESS, TRACHEOBRONCHITIS, CHEMICAL PNEUMONITIS AND POSSIBLE SPASM OF THE VOCAL CORDS. HIGH CONCENTRATIONS MAY PRODUCE BLOODY NASAL SECRETIONS AND SPUTUM, HEMATEMESIS GASTRITIS, AND PULMONARY EDEMA. A SINGLE OVEREXPOSURE MAY LEAD TO LARYNGEAL, TRACHEOBRONCHIAL AND PULMONARY EDEMA. ONE INDIVIDUAL SPRAYED IN THE FACE WITH SULFURIC ACID LIQUID EXPERIENCED DELAYED SYMPTOMS OF PULMONARY FIBROSIS, RESIDUAL BRONCHITIS, AND PULMONARY EMPHYSEMA. VAPORS FROM DILUTE SOLUTIONS MAY IRRITATE MUCOUS MEMBRANES. CHRONIC EXPOSURE- REPEATED EXPOSURE TO THE MIST MAY CAUSE INFLAMMATION OF THE UPPER RESPIRATORY TRACT, CHRONIC BRONCHITIS AND ETCHING OF THE DENTAL ENAMEL. THE CENTRAL AND LATERAL INCISORS ARE PRIMARILY AFFECTED. REPEATED EXCESSIVE EXPOSURE OVER LONG PERIODS OF TIME HAVE RESULTED IN BRONCHITIC SYMPTOMS, RHINORRHEA, FREQUENT RESPIRATORY TRACT INFECTIONS, EMPHYSEMA, STOMATITIS AND DIGESTIVE DISTURBANCES. CHRONIC INHALATION MAY CAUSE ALKALINE DEPLETION OF THE BODY PRODUCING AN ACIDOSIS WHICH AFFECTS THE NERVOUS SYSTEM AND PRODUCES AGITATION, HESITANT GAIT AND GENERALIZED WEAKNESS. AN EPIDEMIOLOGICAL STUDY OF WORKERS AT A REFINERY AND CHEMICAL PLANT SUGGESTS AN INCREASED RISK OF LARYNGEAL CANCER FROM EXPOSURE TO HIGH CONCENTRATIONS OF SULFURIC ACID.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

**SKIN CONTACT:**

**SULFURIC ACID:**

CORROSIVE.

ACUTE EXPOSURE- CONTACT WITH CONCENTRATED SULFURIC ACID MAY CAUSE SEVERE SECOND AND THIRD DEGREE SKIN BURNS WITH NECROSIS DUE TO ITS AFFINITY FOR WATER AND SUBSEQUENT SEVERE DEHYDRATING ACTION, AND ITS EXOTHERMIC REACTION WITH MOISTURE. POSSIBLE CHARRING MAY OCCUR LEADING TO SHOCK AND COLLAPSE DEPENDING ON THE AMOUNT OF TISSUE INVOLVED. THE RESULTING WOUNDS MAY BE LONG IN HEALING AND MAY CAUSE EXTENSIVE SCARRING THAT MAY RESULT IN FUNCTIONAL INHIBITION. CONTACT WITH DILUTE SOLUTIONS MAY CAUSE SKIN IRRITATION.

CHRONIC EXPOSURE- REPEATED CONTACT WITH LOW CONCENTRATIONS MAY CAUSE SKIN DESICCATION AND ULCERATION OF THE HANDS, AND PANARIS OR CHRONIC PURULENT INFLAMMATION AROUND THE NAILS. REPEATED CONTACT WITH DILUTE SOLUTIONS MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

**EYE CONTACT:  
SULFURIC ACID:  
CORROSIVE.**

ACUTE EXPOSURE- EXPOSURE TO THE VAPORS MAY CAUSE A BURNING OR STINGING SENSATION IN THE EYES WITH LACRIMATION, BLURRED VISION AND CONJUNCTIVAL CONGESTION. SPLASHES OF ACID IN THE EYES MAY PRODUCE DEEP CORNEAL ULCERATION, KERATO-CONJUNCTIVITIS AND PALPEBRAL LESIONS WITH SEVERE SEQUELAE. IRREPARABLE CORNEAL DAMAGE AND BLINDNESS AS WELL AS SCARRING OF THE EYELIDS MAY OCCUR. SEVERE SULFURIC ACID EYE BURNS HAVE INCLUDED GLAUCOMA AND CATARACT AS COMPLICATIONS IN THE MOST SEVERE CASES. CONTACT WITH DILUTED ACID MAY PRODUCE MORE TRANSIENT EFFECTS FROM WHICH RECOVERY MAY BE COMPLETE.

CHRONIC EXPOSURE- REPEATED EXPOSURE MAY RESULT IN LACRIMATION AND CHRONIC CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). CONTINUE IRRIGATING WITH NORMAL SALINE UNTIL THE PH HAS RETURNED TO NORMAL (30-60 MINUTES). COVER WITH STERILE BANDAGES. GET MEDICAL ATTENTION IMMEDIATELY.

**INGESTION:  
SULFURIC ACID:  
CORROSIVE.**

ACUTE EXPOSURE- INGESTION MAY CAUSE BURNING PAIN IN THE MOUTH, THROAT, ESOPHAGUS AND ABDOMEN, A SOUR TASTE AND NAUSEA FOLLOWED BY VOMITING AND DIARRHEA OF CHARRED BLACK STOMACH CONTENTS. DEHYDRATION AND CARBONIZATION OF TISSUE MAY OCCUR WITH ESCHARS ON THE LIPS AND MOUTH. BROWNISH OR YELLOWISH STAINS MAY BE FOUND AROUND THE MOUTH, INTENSE THIRST, DIFFICULT SWALLOWING, ACIDEMIA, STOMATITIS, RAPID AND WEAK PULSE, SHALLOW BREATHING, SHOCK AND POSSIBLE CONVULSIONS MAY OCCUR. ALBUMIN, BLOOD AND CASTS IN URINE, ANURIA, ESOPHAGEAL AND DELAYED GASTRIC STENOSIS HAS BEEN REPORTED. POSSIBLE PERFORATION OF THE GASTROINTESTINAL TRACT MAY RESULT IN PERITONITIS.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- IF VICTIM IS CONSCIOUS, GIVE HIM LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE THE ACID. DO NOT INDUCE VOMITING. GIVE PATIENT 1 OUNCE (30 ML) OF MILK OF MAGNESIA. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:  
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

-----  
**REACTIVITY**

**REACTIVITY:**  
VIOLENT EXOTHERMIC REACTION WITH WATER.

**INCOMPATIBILITIES:**

**SULFURIC ACID:**  
ACETALDEHYDE: VIOLENTLY POLYMERIZED BY CONCENTRATED ACID.  
ACETIC ANHYDRIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
ACETONE + NITRIC ACID: VIOLENT DECOMPOSITION.  
ACETONE + POTASSIUM DICHROMATE: IGNITION.  
ACETONE CYANHYDRIN: PRESSURE INCREASE WITH POSSIBLE EXPLOSIVE RUPTURE OF VESSEL.  
ACETONITRILE: VIOLENT EXOTHERM ON HEATING; SULFUR TRIOXIDE REDUCES INITIATION TEMPERATURE.  
ACROLEIN: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
ACRYLONITRILE: VIGOROUS EXOTHERMIC POLYMERIZATION.  
ALCOHOL: EXOTHERMIC REACTION AND CONTRACTION OF VOLUME.  
ALCOHOLS AND HYDROGEN PEROXIDE: POSSIBLE EXPLOSION.  
ALLYL ALCOHOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
ALLYL CHLORIDE: VIOLENT POLYMERIZATION.  
ALKYL NITRATES: MAY CAUSE VIOLENT REACTION.  
2-AMINOETHANOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
AMMONIUM HYDROXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
AMMONIUM IRON(III) SULFATE DODECAHYDRATE: VIOLENT, EXOTHERMIC REACTION ON HEATING.  
AMMONIUM TRIPERCHROMATE: FIRE OR EXPLOSION HAZARD.  
ANILINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
BASES: VIOLENT REACTION.  
BENZYL ALCOHOL: MAY DECOMPOSES EXPLOSIVELY AT ABOUT 180 C.  
BROMATES + METALS: POSSIBLE IGNITION.  
BROMINE PENTAFLUORIDE: VIOLENT REACTION WITH POSSIBLE IGNITION.  
TERT-BUTYL-M-XYLENE: VIOLENT EXOTHERMIC REACTION WITHOUT AGITATION.  
N-BUTYRALDEHYDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
CARBIDES: HAZARDOUS MIXTURE.  
CESIUM ACETYLIDE: IGNITION ON CONTACT.  
4-CHLORONITROBENZENE AND SULFUR TRIOXIDE: POSSIBLE EXPLOSIVE REACTION.  
CHLORATES: ALL CHLORATES, WHEN BROUGHT IN CONTACT WITH SULFURIC ACID MAY GIVE OFF EXPLOSIVE CHLORINE DIOXIDE GAS. A VIOLENT EXPLOSION IS USUAL.  
CHLORATES + METALS: POSSIBLE IGNITION.  
CHLORINE TRIFLUORIDE: VIOLENT REACTION.  
CHLOROSULFONIC ACID: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
CHROMATES: FIRE AND EXPLOSION HAZARD.  
COATINGS: ATTACKED.  
COMBUSTIBLE MATERIALS (FINELY DIVIDED): MAY IGNITE.  
COPPER: EVOLUTION OF SULFUR DIOXIDE.  
CUPROUS NITRIDE: VIOLENT REACTION.  
2-CYANO-4-NITROBENZEDIAZONIUM HYDROGEN SULFATE: EXOTHERMIC REACTION.  
2-CYANO-2-PROPANOL: VIOLENT REACTION WITH INCREASE IN PRESSURE.  
CYCLOPENTADIENE: VIOLENT OR EXPLOSIVE REACTION.  
CYCLOPENTANONE OXIME: VIOLENT REACTION.  
1,3-DIAZIDOBENZENE: IGNITION FOLLOWED BY EXPLOSIVE REACTION.  
DIETHYLAMINE: EXOTHERMIC REACTION.

**\*\*SULFURIC ACID\*\***

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DIISOBUTYLENE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 DIMETHYLBENZYL CARBINOL + HYDROGEN PEROXIDE: EXPLODES.  
 DIMETHOXYANTHRAQUINONE: EXOTHERMIC REACTION ABOVE 150 C.  
 2,5-DINITRO-3-METHYLBENZOIC ACID + SODIUM AZIDE: EXPLOSIVE REACTION.  
 1,5-DINITRONAPHTHALENE + SULFUR: EXOTHERMIC REACTION.  
 EPICHLOROHYDRIN: VIOLENT REACTION.  
 ETHOXYLATED NONYLPHENOL: POSSIBLE IGNITION.  
 ETHANOL + HYDROGEN PEROXIDE: POSSIBLE EXPLOSION.  
 ETHYLENE CYANOHYDRIN: VIOLENT REACTION.  
 ETHYLENE DIAMINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 ETHYLENE GLYCOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 ETHYLENIMINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 FULMINATES: EXTREMELY HAZARDOUS MIXTURE.  
 HEXALITHIUM DISILICIDE: INCANDESCENT REACTION.  
 HYDROCHLORIC ACID: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 HYDROGEN PEROXIDE (>50%): EXPLOSIVE REACTION AFTER EVAPORATION.  
 HYDROFLUORIC ACID: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 INDANE + NITRIC ACID: POSSIBLE EXPLOSION.  
 IODINE HEPTAFLUORIDE: THE ACID BECOMES EFFERVESCENT.  
 IRON: POSSIBLE EXPLOSION DUE TO HYDROGEN GAS FROM THE ACID-METAL REACTION.  
 ISOPRENE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 LITHIUM SILICIDE: INCANDESCENT REACTION.  
 MERCURY NITRIDE: EXPLOSION ON CONTACT.  
 MESITYL OXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 METALS: MAY LIBERATE FLAMMABLE HYDROGEN GAS.  
 METALS (POWDERED): EXTREMELY HAZARDOUS MIXTURE.  
 METAL ACETYLIDES: IGNITION REACTION.  
 METAL CHLORATES: VIOLENT EXPLOSION UNLESS PROPERLY COOLED.  
 METAL PERCHLORATES: FORMATION OF EXPLOSIVE PERCHLORIC ACID.  
 4-METHYLPYRIDINE: EXOTHERMIC REACTION.  
 NITRAMIDE: MAY DECOMPOSE EXPLOSIVELY ON CONTACT.  
 NITRATES: INCOMPATIBLE.  
 NITRIC ACID + GLYCERIDES: EXPLOSION.  
 NITRIC ACID + ORGANIC MATERIAL: MAY CAUSE VIOLENT REACTION.  
 NITRIC ACID + TOLUENE: POSSIBLE VIOLENT REACTION OR EXPLOSION.  
 NITROARYL BASES AND DERIVATIVES: MAY CAUSE VIOLENT REACTION OR EXPLOSION.  
 NITROBENZENE: EXOTHERMIC REACTION AT ELEVATED TEMPERATURES.  
 3-NITROBENZENESULFONIC ACID: EXOTHERMIC REACTION.  
 NITROMETHANE: FORMATION OF EXPLOSIVE MIXTURE.  
 N-NITROMETHYLAMINE: EXPLOSIVE DECOMPOSITION.  
 4-NITROTOLUENE: EXPLOSIVE AT 80 C.  
 ORGANICS: VIOLENT EXOTHERMIC REACTION.  
 PENTASILVER TRIHYDROXYDIAMINOPHOSPHATE: EXPLOSION ON CONTACT.  
 PERCHLORATES: POSSIBLE EXPLOSION.  
 PERCHLORIC ACID: FORMATION OF DANGEROUS ANHYDROUS PERCHLORIC ACID.  
 PERMANGANATES: FORMATION OF PERMANGANIC ACID.  
 PERMANGANATES + BENZENE: POSSIBLE EXPLOSION.  
 1-PHENYL-2-METHYL-PROPYL ALCOHOL + HYDROGEN PEROXIDE: POSSIBLE EXPLOSION.  
 PHOSPHORUS (WHITE OR YELLOW): IGNITION IN CONTACT WITH BOILING ACID.  
 PHOSPHORUS ISOCYANATE: VIOLENT REACTION.  
 PHOSPHORUS TRIOXIDE: VIOLENT OXIDATION WITH POSSIBLE IGNITION.  
 PICRATES: EXTREMELY HAZARDOUS MIXTURE.  
 PLASTICS: ATTACKED.  
 POLYSILYLENE: EXPLOSION ON CONTACT.  
 POTASSIUM: EXPLOSIVE INTERACTION.  
 POTASSIUM TERT-BUTOXIDE: IGNITION.  
 POTASSIUM CHLORATE: POSSIBLE FIRE AND EXPLOSION.  
 POTASSIUM PERMANGANATE: POSSIBLE EXPLOSION IN THE PRESENCE OF MOISTURE.  
 POTASSIUM PERMANGANATE + POTASSIUM CHLORIDE: VIOLENT EXPLOSION.  
 PROPIOLACTONE (BETA): TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 PROPYLENE OXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 3-PROPYNOL: POSSIBLE EXPLOSION UNLESS ADEQUATELY COOLED.  
 PYRIDINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 REDUCING AGENTS: REACTS.  
 RUBBER: ATTACKED.  
 RUBIDIUM ACETYLIDE: IGNITION ON CONTACT.  
 SILVER PERMANGANATE (MOIST): EXPLOSIVE REACTION.  
 SILVER PEROXOCHROMATE: EXPLOSIVE REACTION.  
 SODIUM: EXPLOSIVE REACTION WITH AQUEOUS ACID.  
 SODIUM CARBONATE: VIOLENT REACTION.  
 SODIUM CHLORATE: POSSIBLE FIRE OR EXPLOSION.  
 SODIUM HYDROXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 SODIUM TETRAHYDROBORATE: VIOLENT, EXOTHERMIC REACTION.  
 SODIUM THIOCYANATE: VIOLENT EXOTHERMIC WITH EVOLUTION OF CARBONYL SULFIDE.  
 STEEL: POSSIBLE EXPLOSION DUE TO HYDROGEN GAS FROM THE ACID-METAL REACTION.  
 STYRENE MONOMER: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 TETRAMETHYLBENZENES: VIOLENT REACTION IN CLOSED CONTAINERS.  
 1,2,4,5-TETRAZINE: VIOLENT DECOMPOSITION ON CONTACT.  
 THALLIUM(I) AZIDIDITHIOCARBONATE: MAY EXPLODE ON CONTACT.  
 1,3,5-TRINITROSOHEXAHYDRO-1,3,5-TRIAZINE: EXPLOSIVE DECOMPOSITION ON CONTACT.  
 VINYL ACETATE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.  
 ZINC CHLORATE: LIKELY TO CAUSE FIRES AND EXPLOSIONS.  
 ZINC IODIDE: VIOLENT INTERACTION.

DECOMPOSITION:  
 THERMAL DECOMPOSITION MAY RELEASE TOXIC OXIDES OF SULFUR.

POLYMERIZATION:  
 HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

-----  
**STORAGE AND DISPOSAL**

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

**\*\*STORAGE\*\***

PROTECT AGAINST PHYSICAL DAMAGE AND WATER. SEPARATE FROM CARBIDES, CHLORATES, FULMINATES, NITRATES, PICRATES, POWDERED METALS, AND COMBUSTIBLE MATERIALS (NFPA 49, HAZARDOUS CHEMICALS DATA, 1975).

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

THRESHOLD PLANNING QUANTITY (TPQ):  
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION FOR THE STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOCAL EMERGENCY RESPONSE PLANNING (40 CFR 355.30).

**\*\*DISPOSAL\*\***

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262, EPA HAZARDOUS WASTE NUMBER D002.

\*\*\*\*\*  
CONDITIONS TO AVOID

MAY IGNITE OTHER COMBUSTIBLE MATERIALS (WOOD, PAPER, OIL, ETC.). VIOLENT REACTION WITH WATER. FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN CONFINED SPACES. RUNOFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

\*\*\*\*\*  
SPILL AND LEAK PROCEDURES

SOIL SPILL:  
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE.

USE CEMENT POWDER OR FLY ASH TO ABSORB LIQUID MASS.

NEUTRALIZE SPILL WITH SLAKED LIME, SODIUM BICARBONATE OR CRUSHED LIMESTONE.

AIR SPILL:  
APPLY WATER SPRAY TO KNOCK DOWN AND REDUCE VAPORS. KNOCK-DOWN WATER IS CORROSIVE AND TOXIC AND SHOULD BE DIKED FOR CONTAINMENT AND LATER DISPOSAL.

WATER SPILL:  
NEUTRALIZE WITH AGRICULTURAL LIME, SLAKED LIME, CRUSHED LIMESTONE, OR SODIUM BICARBONATE.

OCCUPATIONAL SPILL:  
KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL. DO NOT TOUCH SPILLED MATERIAL. DO NOT GET WATER INSIDE CONTAINER. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. DO NOT PUT WATER ON LEAK OR SPILL AREA. CLEAN UP ONLY UNDER THE SUPERVISION OF AN EXPERT. DIKE SPILL FOR LATER DISPOSAL. DO NOT APPLY WATER UNLESS DIRECTED TO DO SO. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

REPORTABLE QUANTITY (RQ): 1000 POUNDS  
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

-----  
**PROTECTIVE EQUIPMENT**

VENTILATION:  
PROCESS ENCLOSURE RECOMMENDED TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:  
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS OR NIOSH CRITERIA DOCUMENTS; OR DEPARTMENT OF LABOR, 29CFR1910 SUBPART Z.  
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION.

SULFURIC ACID:

25 MG/M3- ANY POWERED AIR-PURIFYING RESPIRATOR WITH AN ACID GAS CARTRIDGE(S) AND HAVING A HIGH-EFFICIENCY PARTICULATE FILTER.  
ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.

50 MG/M3- ANY CHEMICAL CARTRIDGE RESPIRATOR WITH A FULL FACEPIECE AND ACID GAS CARTRIDGE(S) IN COMBINATION WITH A HIGH-EFFICIENCY PARTICULATE FILTER.  
ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.  
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.  
ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A

\*\*\*SULFURIC ACID\*\*\* PAGE 06 OF 06  
CHIN-STYLE OR FRONT- OR BACK-MOUNTED ACID GAS CANISTER HAVING A  
HIGH-EFFICIENCY PARTICULATE FILTER.

80 MG/M3- ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A  
PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A  
CHIN-STYLE OR FRONT- OR BACK-MOUNTED ACID GAS CANISTER HAVING A  
HIGH-EFFICIENCY PARTICULATE FILTER.  
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE  
DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND  
OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY  
SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER  
POSITIVE PRESSURE MODE.

CLOTHING:

WEAR APPROPRIATE PROTECTIVE CLOTHING TO AVOID ANY POSSIBILITY OF SKIN CONTACT  
WITH LIQUIDS CONTAINING MORE THAN 1% SULFURIC ACID. AVOID REPEATED OR  
PROLONGED SKIN CONTACT WITH LIQUIDS CONTAINING 1% OR LESS SULFURIC ACID.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS  
SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A  
FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT  
BE WORN.

EMERGENCY WASH FACILITIES:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE  
EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN  
AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC GROUP, INC.  
CREATION DATE: 11/28/84 REVISION DATE: 12/21/88

-ADDITIONAL INFORMATION-

THE INFORMATION BELOW IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST  
INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, WE MAKE NO WARRANTY OF  
MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO  
SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS  
SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE  
INFORMATION FOR THEIR PARTICULAR PURPOSES.



BETZ INDUSTRIAL DIV.  
1 QUALITY WAY, TREVOSE, PA.19053 (215) 953-2463  
BETZ MATERIAL SAFETY DATA SHEET (PAGE 1 OF 3)  
EMERGENCY TELEPHONE (HEALTH/ACCIDENT) (800)877-1940  
EFFECTIVE DATE 02-16-91

PRODUCT: OPTI-MEEN- 85218

PRINTED: 11-18-92  
REVISIONS TO SECTIONS: -;EDIT:APPENDIX

PRODUCT APPLICATION : NEUTRALIZING AMINE.

-----SECTION 1-----HAZARDOUS INGREDIENTS-----

INFORMATION ON PHYSICAL HAZARDS, HEALTH HAZARDS, PEL'S AND TLV'S FOR SPECIFIC PRODUCT INGREDIENTS AS REQUIRED BY THE OSHA HAZARD COMMUNICATIONS STANDARD IS LISTED. REFER TO SECTION 4 (PAGE 2) FOR OUR ASSESSMENT OF THE POTENTIAL ACUTE AND CHRONIC HAZARDS OF THIS FORMULATION.

METHOXYPROPYLAMINE, 3-\*\*\*CAS#5332-73-0; FLAMMABLE LIQUID; CORROSIVE;  
PEL/TLV: NONE

-----SECTION 2-----TYPICAL PHYSICAL DATA-----

PH: AS IS	(APPROX.) 12.0	ODOR: AMINE
FL.PT. (DEG.F): 154	P-M(CC)	SP.GR. (70F) OR DENSITY: 0.968
VAPOR PRESSURE (mmHG): 18		VAPOR DENSITY (AIR=1): <1
VISC cps 70F: 18		%SOLUBILITY (WATER): 100
EVAP.RATE: ND	WATER=1	APPEARANCE: COLORLESS
PHYSICAL STATE: LIQUID		FREEZE POINT (DEG.F): <-30

-----SECTION 3-----REACTIVITY DATA-----

STABLE. MAY REACT WITH STRONG OXIDIZERS. DO NOT CONTAMINATE. BETZ TANK  
CLEAN-OUT CATEGORY 'B'

THERMAL DECOMPOSITION (DESTRUCTIVE FIRES) YIELDS ELEMENTAL OXIDES.

F DUCT: OPTI-MEEN- 85218

## ---SECTION 4-----HEALTH HAZARD EFFECTS-----

ACUTE SKIN EFFECTS \*\*\* PRIMARY ROUTE OF EXPOSURE

CORROSIVE TO SKIN.POTENTIAL SKIN SENSITIZER

ACUTE EYE EFFECTS \*\*\*

CORROSIVE TO THE EYES

ACUTE RESPIRATORY EFFECTS \*\*\* PRIMARY ROUTE OF EXPOSURE

VAPORS,GASES,MISTS AND/OR AEROSOLS CAUSE IRRITATION TO UPPER

RESPIRATORY TRACT

CHRONIC EFFECTS OF OVEREXPOSURE\*\*\*

PROLONGED OR REPEATED CONTACT MAY CAUSE TISSUE NECROSIS.

MEDICAL CONDITIONS AGGRAVATED \*\*\*

NOT KNOWN

SYMPTOMS OF EXPOSURE \*\*\*

INHALATION MAY CAUSE IRRITATION OF MUCOUS MEMBRANES AND RESPIRATORY TRACT;  
SKIN CONTACT CAUSES SEVERE IRRITATION OR BURNS.

## -----SECTION 5-----FIRST AID INSTRUCTIONS-----

SKIN CONTACT\*\*\*

REMOVE CLOTHING.WASH AREA WITH LARGE AMOUNTS OF SOAP SOLUTION OR WATER  
FOR 15 MIN.IMMEDIATELY CONTACT PHYSICIAN

EYE CONTACT\*\*\*

IMMEDIATELY FLUSH EYES WITH WATER FOR 15 MINUTES.IMMEDIATELY CONTACT A  
PHYSICIAN FOR ADDITIONAL TREATMENT

INHALATION EXPOSURE\*\*\*

REMOVE VICTIM FROM CONTAMINATED AREA.APPLY NECESSARY FIRST AID  
TREATMENT.IMMEDIATELY CONTACT A PHYSICIAN.

INGESTION\*\*\*

DO NOT FEED ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSIVE VICTIM.  
DO NOT INDUCE VOMITING.IMMED.CONTACT PHYSICIAN.DILUTE CONTENTS OF  
STOMACH USING 3-4 GLASSES MILK OR WATER

## -----SECTION 6-----SPILL, DISPOSAL AND FIRE INSTRUCTIONS-----

SPILL INSTRUCTIONS\*\*\*

VENTILATE AREA,USE SPECIFIED PROTECTIVE EQUIPMENT.CONTAIN AND ABSORB  
ON ABSORBENT MATERIAL.PLACE IN WASTE DISPOSAL CONTAINER. THE WASTE  
CHARACTERISTICS OF THE ABSORBED MATERIAL,OR ANY CONTAMINATED SOIL,  
SHOULD BE DETERMINED IN ACCORDANCE WITH RCRA REGULATIONS.  
REMOVE IGNITION SOURCES.FLUSH AREA WITH WATER.SPREAD  
SAND/GRIT.

DISPOSAL INSTRUCTIONS\*\*\*

WATER CONTAMINATED WITH THIS PRODUCT MAY BE SENT TO A SANITARY  
SEWER TREATMENT FACILITY,IN ACCORDANCE WITH ANY LOCAL AGREEMENT,A  
PERMITTED WASTE TREATMENT FACILITY OR DISCHARGED UNDER A NPDES PERMIT  
PRODUCT(AS IS) -

INCINERATE OR BURY IN APPROVED LANDFILL

FIRE EXTINGUISHING INSTRUCTIONS\*\*\*

FIREFIGHTERS SHOULD WEAR POSITIVE PRESSURE SELF-CONTAINED BREATHING  
APPARATUS(FULL FACE-PIECE TYPE).PROPER FIRE EXTINGUISHING MEDIA:  
DRY CHEMICAL,CARBON DIOXIDE,FOAM OR WATER

BETZ MATERIAL SAFETY DATA SHEET

(PAGE 3 OF 3)

PRODUCT: OPTI-MEEN- 85218

-----SECTION 7-----SPECIAL PROTECTIVE EQUIPMENT-----  
USE PROTECTIVE EQUIPMENT IN ACCORDANCE WITH 29CFR SECTION 1910.132-134. USE  
RESPIRATORS WITHIN USE LIMITATIONS OR ELSE USE SUPPLIED AIR RESPIRATORS.  
VENTILATION PROTECTION\*\*\*

ADEQUATE VENTILATION

RECOMMENDED RESPIRATORY PROTECTION\*\*\*

IF VENTILATION IS INADEQUATE OR SIGNIFICANT PRODUCT EXPOSURE IS LIKELY,  
USE A RESPIRATOR WITH ORGANIC VAPOR CARTRIDGES.

RECOMMENDED SKIN PROTECTION\*\*\*

GAUNTLET-TYPE RUBBER GLOVES, CHEMICAL RESISTANT APRON

WASH OFF AFTER EACH USE. REPLACE AS NECESSARY

RECOMMENDED EYE PROTECTION\*\*\*

SPLASH PROOF CHEMICAL GOGGLES. FACE SHIELD

-----SECTION 8-----STORAGE AND HANDLING PRECAUTIONS-----  
STORAGE INSTRUCTIONS\*\*\*

KEEP DRUMS & PAILS CLOSED WHEN NOT IN USE.

STORE IN COOL VENTILATED LOCATION. STORE AWAY FROM OXIDIZERS

HANDLING INSTRUCTIONS\*\*\*

COMBUSTIBLE. DO NOT USE AROUND SPARKS OR FLAMES. BOND CONTAINERS  
DURING FILLING OR DISCHARGE WHEN PERFORMED AT TEMPERATURES AT OR  
ABOVE THE PRODUCT FLASH POINT.

\*\*\*\*\*  
THIS MSDS WAS WRITTEN TO COMPLY WITH THE OSHA HAZARD COMMUNICATION STANDARD  
\*\*\*\*\*

APPENDIX: REGULATORY INFORMATION

THE CONTENT OF THIS APPENDIX REPRESENTS INFORMATION KNOWN TO BETZ ON THE  
EFFECTIVE DATE OF THIS MSDS. THIS INFORMATION IS BELIEVED TO BE ACCURATE.  
ANY CHANGES IN REGULATIONS WILL RESULT IN UPDATED VERSIONS OF THIS DOCUMENT.

...TSCA: ALL COMPONENTS OF THIS PRODUCT ARE LISTED ON THE TSCA INVENTORY  
...REPORTABLE QUANTITY(RQ) FOR UNDILUTED PRODUCT:  
NOT APPLICABLE

...RCRA: IF THIS PRODUCT IS DISCARDED AS A WASTE, THE RCRA HAZARDOUS WASTE  
IDENTIFICATION NUMBER IS: D002=CORROSIVE (SKIN, PH)

...DOT HAZARD/UN#/ER GUIDE# IS: CORROSIVE TO SKIN. COMBUSTIBLE UN1760/#60

...CALIFORNIA SAFE DRINKING WATER ACT (PROPOSITION 65) MATERIALS: NONE

...SARA SECTION 302 CHEMICALS: NONE

...SARA SECTION 313 CHEMICALS: NONE

...SARA SECTION 312 HAZARD CLASS: IMMEDIATE (ACUTE), DELAYED (CHRONIC) AND FIRE

...MICHIGAN CRITICAL MATERIALS: NONE

NFPA/HMIS : HEALTH - 3 ; FIRE - 2 ; REACTIVITY - 0 ; SPECIAL - CORR ; PE - D

RECEIVED

JUL 19 1993

Water Quality Applications

BETZ MATERIAL  
SAFETY DATA SHEETEFFECTIVE DATE: 02-SEP-1995  
PRINTED DATE: 02-SEP-1995

## 1) CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : BETZ POLYMER CDP-90192

PRODUCT APPLICATION AREA: COAGULANT.

## COMPANY ADDRESS:

Betz Laboratories, Inc.  
4636 Somerton Road, Trevose, Pa. 19053  
Information phone number: (215) - 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT): (800)-877-1940 (USA)

## 2) COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the OSHA HAZARD COMMUNICATIONS STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

## HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
25988-97-0	QUATERNIZED POLYAMINE Irritant (eyes)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

Post-It® Fax Note	7671	Date	9-22	# of pages	7
To	Joel Tomme	From	Steve M		
Co./Dept.		Co.			
Phone #		Phone #			
Fax #	903 938 4270	Fax #			

PRODUCT NAME : BETZ POLYMER CDP-90192

EFFECTIVE DATE: 02-SEP-1995

## 3) HAZARDS IDENTIFICATION

\*\*\*\*\*

## EMERGENCY OVERVIEW

## WARNING

May cause slight irritation to the skin. Severe irritant to the eyes. Vapors, gases, mists and/or aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable

Emergency Response Guide is not applicable

Odor: Amine; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media:

Dry chemical/CO2/foam or water. Slippery condition. Use sand/grit.

\*\*\*\*\*

## POTENTIAL HEALTH EFFECTS

## ACUTE SKIN EFFECTS:

Primary route of exposure; May cause slight irritation to the skin.

## ACUTE EYE EFFECTS:

Severe irritant to the eyes.

## ACUTE RESPIRATORY EFFECTS:

Vapors, gases, mists and/or aerosols may cause irritation to upper respiratory tract.

## INGESTION EFFECTS:

May cause slight gastrointestinal irritation.

## TARGET ORGANS:

No evidence of potential chronic effects.

## MEDICAL CONDITIONS AGGRAVATED:

Not known.

## SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin.

PRODUCT NAME : BETZ POLYMER CDP-90192

EFFECTIVE DATE: 02-SEP-1995

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4) FIRST AID MEASURES

## SKIN CONTACT:

Remove contaminated clothing. Wash exposed area with a large quantity of soap solution or water for 15 minutes.

## EYE CONTACT:

Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.

## INHALATION:

Remove victim from contaminated area to fresh air. Apply appropriate first aid treatment as necessary.

## INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

---

## 5) FIRE FIGHTING MEASURES

## FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

## EXTINGUISHING MEDIA:

Dry chemical/CO2/foam or water. Slippery condition. Use sand/grit.

## HAZARDOUS DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

## FLASH POINT:

> 200F P-M(CC)

---

## 6) ACCIDENTAL RELEASE MEASURES

## PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container.

Flush area with water. Wet area may be slippery. Spread sand/grit.

## DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

---

## 7) HANDLING AND STORAGE

## HANDLING:

Normal chemical handling.

## STORAGE:

Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers.

PRODUCT NAME : BETZ POLYMER CDP-90192

EFFECTIVE DATE: 02-SEP-1995

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8) EXPOSURE CONTROLS/PERSONAL PROTECTION

CHEMICAL NAME	EXPOSURE LIMITS
QUATERNIZED POLYAMINE	
PEL (OSHA):	NOT DETERMINED
TLV (ACGIH):	NOT DETERMINED

## ENGINEERING CONTROLS:

Adequate ventilation.

## PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

## RESPIRATORY PROTECTION:

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. Use air-purifying respirators within use limitations associated with the equipment or else use supplied air-respirators. If air-purifying respirator use is appropriate, use a respirator with organic vapor cartridges.

## SKIN PROTECTION:

Rubber gloves. Wash off after each use. Replace as necessary.

## EYE PROTECTION:

Splash proof chemical goggles.

---

9) PHYSICAL AND CHEMICAL PROPERTIES

Specific Grav. (70F)	1.113	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	10.00	Vapor Density (air=1)	< 1.00
Viscosity (cps 70F)	66	% Solubility (water)	100.0
Odor	Amine		
Appearance	Colorless To Yellow		
Physical State	Liquid		
Flash Point (F)	> 200	P-M(CC)	
pH As Is (approx.)	7.1		
Evaporation Rate (Butyl Acetate=1)	< 1.00		

A = not applicable ND = not determined

PRODUCT NAME : BETZ POLYMER CDP-90192

EFFECTIVE DATE: 02-SEP-1995

---

10) STABILITY AND REACTIVITY

## STABILITY:

Stable

## HAZARDOUS POLYMERIZATION:

Will not occur.

## INCOMPATIBILITIES:

May react with strong oxidizers.

## DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

## BETZ INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"B"

---

11) TOXICOLOGICAL INFORMATION

Oral LD50 RABBIT:	1,200 mg/kg
90 Day Feed Study RAT:	NEGATIVE
90 Day Feed Study DOG:	NEGATIVE
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

---

12) ECOLOGICAL INFORMATION

## AQUATIC TOXICOLOGY

## Rainbow Trout 96 Hour Static Screen

100% Mortality: 1 mg/L

0% Mortality: .1 mg/L

## Daphnia magna 48 Hour Static Acute Bioassay

LC50: .18 mg/L

## Bluegill Sunfish 96 Hour Static Acute Bioassay

LC50: .46 mg/L

No Effect Level: .32 mg/L

## BIODEGRADATION

COD (mg/gm):	347
TOC (mg/gm):	153
BOD-5 (mg/gm):	5
BOD-28 (mg/gm):	9



PRODUCT NAME : BETZ POLYMER CDP-90192

EFFECTIVE DATE: 02-SEP-1991

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13) DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :  
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

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## 14) TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

---

## 15) REGULATORY INFORMATION

## TSCA:

All components of this product are listed in the TSCA inventory.  
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

## POTABLE WATER APPROVAL:

EPA up to 50ppm-also Florida

## POTABLE WATER APPROVAL:

EPA up to 50ppm-also Florida

## SARA SECTION 312 HAZARD CLASS:

Immediate (acute)

## SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

## SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

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## CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC  
ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

---

## MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

PRODUCT NAME : BETZ POLYMER CDP-90192

EFFECTIVE DATE: 02-SEP-199

## 16) OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	2	Moderate Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

## CHANGE LOG

EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
-----	-----	-----
MSDS status: 22-AUG-95	REVISED FORMAT	

# MATERIAL SAFETY DATA SHEET

## SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: SODIUM PHOSPHATE DIBASIC, ANHYDROUS ACS

PRODUCT DESCRIPTION:

DATE PREPARED: 15 MAY 2000

SUPPLIER NAME AND ADDRESS: ACS Chemical, Inc.  
660 Mantoloking Rd.  
Brick, NJ 08724

SUPPLIER PHONE: 732-477-9133

EMERGENCY PHONE - 24 HOURS: CALL CHEM-TEL, INC. (800) 255-3924

## SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	WT. %	OSHA PEL	ACGIH TLV	CAS REGISTRY#
SODIUM PHOSPHATE DIBASIC, ANYDROUS, ACS				7758-79-4

## SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW IRRITANT! IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.

### POTENTIAL HEALTH EFFECTS

INHALATION: IRRITANT.  
EYE CONTACT: IRRITATING TO EYES.  
SKIN CONTACT: IRRITATING TO SKIN.  
INGESTION: IRRITANT.  
CHRONIC: N/A

HMIS HAZARD CODE: HEALTH: FLAMMABILITY: 0 REACTIVITY:

## SECTION 4 FIRST AID MEASURES

INHALATION: IF INHALED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.  
EYE CONTACT: IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF WATER AND SEEK MEDICAL ADVICE.  
SKIN CONTACT: IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER AND SEEK MEDICAL ADVICE.  
INGESTION: IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.

## SECTION 5 FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: N/A)  
FLAMMABLE LIMITS LFL.....N/A UFL.....N/A  
LEL.....N/A UEL.....N/A

GENERAL HAZARD.....N/A

FIRE FIGHTING INSTRUCTIONS.....: USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.

FIRE FIGHTING EQUIPMENT.....: WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH EYES AND SKIN.

HAZARDOUS COMBUSTION PRODUCTS.... EMITS TOXIC FUMES UNDER FIRE CONDITONS..

## SECTION 6 ACCIDENTAL RELEASE MEASURES

**LAND SPILL:** WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES. SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL. AVOID RAISING DUST. VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

**WATER SPILL:** N/A

## SECTION 7 HANDLING AND STORAGE

**STORAGE TEMPERATURE:** AMBIENT  
**STORAGE PRESSURE:** ATMOSPHERIC  
**GENERAL:** WASH THOROUGHLY AFTER HANDLING. KEEP TIGHTLY CLOSED. STORE IN A COOL DRY PLACE.

## SECTION 8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

**ENGINEERING CONTROLS**  
VENTILATION: MECHANICAL

**PERSONAL PROTECTION**  
RESPIRATOR: WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.  
PROTECTIVE CLOTHING: CHEMICAL RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
• ADDITIONAL INFORMATION: SAFETY SHOWER AND EYE BATH RECOMMENDED.  
•

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

<b>VAPOR PRESSURE:</b>	TO WATER	<b>VAPOR DENSITY:</b>	4.9
<b>SPECIFIC GRAVITY.....:</b>	N/A	(air=1)	
<b>SOLUBILITY IN WATER.....:</b>	N/A	<b>EVAPORATION RATE.....:</b>	TO WATER
<b>pH.....:</b>	N/A	(n-Butyl Acetate=1)	
<b>BOILING POINT.....:</b>	N/A	<b>FREEZING POINT.....:</b>	N/A
<b>VISCOSITY.....:</b>	N/A	<b>ODOR.....:</b>	N/A
<b>APPEARANCE.....:</b>	N/A		
<b>PHYSICAL STATE.....:</b>	SOLID		

## SECTION 10 STABILITY AND REACTIVITY

**GENERAL:** N/A  
**INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:** STRONG ACIDS.  
**HAZARDOUS DECOMPOSITION:** NATURE OF DECOMPOSITION PRODUCTS NOT KNOWN.

## SECTION 11 TOXICOLOGICAL INFORMATION

**ACUTE EFFECTS:** MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION. CAUSES EYE AND SKIN IRRITATION. MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT. TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

## SECTION 12 ECOLOGICAL INFORMATION

NO DATA AVAILABLE

## SECTION 13 DISPOSAL CONSIDERATIONS

FOR SMALL QUANTITIES: CAUTIOUSLY ADD TO A LARGE STIRRED EXCESS OF WATER. ADJUST THE PH TO NEUTRAL, SEPARATE ANY INSOLUBLE SOLIDS OR LIQUIDS AND PACKAGE THEM FOR HAZARDOUS WASTE DISPOSAL. FLUSH THE AQUEOUS SOLUTION DOWN THE DRAIN WITH PLENTY OF WATER. THE HYDROLYSIS AND NEUTRALIZATION REACTIONS MAY GENERATE HEAT AND FUMES WHICH CAN BE CONTROLLED BY THE RATE OF ADDITION.

DISPOSAL IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

## SECTION 14 TRANSPORT INFORMATION

DOT (Department Of Transportation)

PROPER SHIPPING NAME: N/A  
UN NUMBER: N/A  
HAZARD CLASS: N/A  
PACKING GROUP: N/A

EMERGENCY PHONE - 24 HOURS: CALL CHEM-TEL, INC. (800) 255-3924

## SECTION 15 REGULATORY INFORMATION

EUROPEAN INFORMATION: IRRITANT. IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.  
WEAR SUITABLE PROTECTIVE CLOTHING.

OEL-MAK

EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION.

FEHAC 54, 7740, 89

NOHS 1974: 83514; NIS 85; TNF 6564; NOS 60; TNE 37176.

NOES 1983: HZD 83514; NIS 166; TNF 21015; NOS 135; TNE 1230592; TFE 912048.

## SECTION 16 OTHER INFORMATION

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, ACS Chemical, Inc., makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, ACS Chemical, Inc., will not be responsible for damages of any kind resulting from the use of or reliance upon such information.

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# MATERIAL SAFETY DATA SHEET

## SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: POTASSIUM PHOSPHATE DIBASIC, ANHYDROUS ACS REAGENT  
PRODUCT DESCRIPTION:

DATE PREPARED: 15 JAN 2000

SLP:

EMERGENCY PHONE - 24 HOURS: CALL CHEM-TEL, INC. (800) 255-3824

## SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	WT. %	OSHA PEL	ACGIH TLV	CAS REGISTRY#
POTASSIUM PHOSPHATE DIBASIC, ANHYDROUS				7758-11-4

## SECTION 3 HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

### POTENTIAL HEALTH EFFECTS

INHALATION: MAY BE HARMFUL IF INHALED.  
EYE CONTACT: MAY CAUSE IRRITATION.  
SKIN CONTACT: MAY BE HARMFUL ABSORBED THROUGH SKIN.  
INGESTION: MAY BE HARMFUL IF SWALLOWED.  
CHRONIC: N/A

HMIS HAZARD CODE: HEALTH: FLAMMABILITY: 0 REACTIVITY:

## SECTION 4 FIRST AID MEASURES

INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
EYE CONTACT: IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. TO ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS.  
SKIN CONTACT: WASH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING.  
INGESTION: WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.

## SECTION 5 FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: N/A)

FLAMMABLE LIMITS LFL.....N/A UFL.....N/A  
LEL.....N/A UEL.....N/A

GENERAL HAZARD.....N/A

FIRE FIGHTING INSTRUCTIONS..... WATER SPRAY, CARBONDIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

FIRE FIGHTING EQUIPMENT..... WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

HAZARDOUS COMBUSTION PRODUCTS.... EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

## SECTION 6 ACCIDENTAL RELEASE MEASURES

**LAND SPILL:** USE PROTECTIVE CLOTHING, CHEMICAL SAFETY GOGGLES, COMPATIBLE CHEMICAL RESISTANT GLOVES AND MASK. SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL. AVOID RAISING DUST. VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

**WATER SPILL:** N/A

## SECTION 7 HANDLING AND STORAGE

**STORAGE TEMPERATURE:** AMBIENT  
**STORAGE PRESSURE:** ATMOSPHERIC  
**GENERAL:** WASH THOROUGHLY AFTER HANDLING. KEEP TIGHTLY CLOSED. STORE IN A COOL DRY PLACE.

## SECTION 8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

**ENGINEERING CONTROLS**  
VENTILATION: MECHANICAL

### PERSONAL PROTECTION

**RESPIRATOR:** NIOSH/MSHA APPROVED RESPIRATOR IN NONVENTILATED AREAS AND/OR FOR EXPOSURE ABOVE THE AGGHI TLV.

**PROTECTIVE CLOTHING:** CHEMICAL SAFETY GOGGLES, COMPATIBLE CHEMICAL RESISTANT GLOVES.

- **ADDITIONAL INFORMATION:** SAFETY SHOWERS AND EYE BATH.
- 

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

<b>VAPOR PRESSURE:</b>	TO WATER	<b>VAPOR DENSITY:</b>	TO WATER
<b>SPECIFIC GRAVITY.....</b>	N/A	(air=1)	
<b>SOLUBILITY IN WATER.....</b>	N/A	<b>EVAPORATION RATE.....</b>	TO WATER
<b>pH.....</b>	N/A	(n-Butyl Acetate=1)	
<b>BOILING POINT.....</b>	N/A	<b>FREEZING POINT.....</b>	N/A
<b>VISCOSITY.....</b>	N/A	<b>ODOR.....</b>	N/A
<b>APPEARANCE.....</b>	WHITE POWDER		
<b>PHYSICAL STATE.....</b>	N/A		

## SECTION 10 STABILITY AND REACTIVITY

**GENERAL:** N/A

**INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:** STRONG OXIDIZING AGENTS, PROTECT FROM MOISTURE.

**HAZARDOUS DECOMPOSITION:** NATURE OF DECOMPOSITION PRODUCTS NOT KNOWN.

## SECTION 11 TOXICOLOGICAL INFORMATION

**ACUTE EFFECTS:** MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION. MAY CAUSE EYE AND SKIN IRRITATION. MATERIAL MAY BE IRRITATING TO MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT. TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL AND TOXOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

## SECTION 12 ECOLOGICAL INFORMATION

NO DATA AVAILABLE

### SECTION 13 DISPOSAL CONSIDERATIONS

DISPOSAL IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

### SECTION 14 TRANSPORT INFORMATION

DOT (Department Of Transportation)

PROPER SHIPPING NAME: N/A

UN NUMBER: N/A

HAZARD CLASS: N/A

PACKING GROUP: N/A

EMERGENCY PHONE - 24 HOURS: CALL CHEM-TEL, INC. (800) 255-3924

### SECTION 15 REGULATORY INFORMATION

NO DATA AVAILABLE

### SECTION 16 OTHER INFORMATION

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, ACS Chemical, Inc., makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, ACS Chemical, Inc., will not be responsible for damages of any kind resulting from the use of or reliance upon such information.

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733 Heights Boulevard ★ Houston Texas 77007  
(713) 802-1761 ★ FAX: (713) 869-0680

## MATERIAL SAFETY DATA SHEET

### SECTION 1 - CHEMICAL PRODUCT IDENTIFICATION

#### POLYMER 577 FLOCCULANT

NFPA Rating	Red	Blue	Yellow
	1	1	0

Cationic Polymer

SYNONYMS: Polyquaternary amine in water solution

MSDS Date 12.12.96

### SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

*OSHA Regulated Components:*

NO.	COMPONENT	CAS REG NO.	WEIGHT (%)
	No permissible Exposure Limits (PEV/TLV) have been established by OSHA or ACGIH		

See SECTION 8, Exposure Controls/Personal Protection.

### SECTION 3 - HAZARDOUS IDENTIFICATION

**CAUTION: MAY CAUSE SKIN IRRITATION**

#### PRIMARY ROUTES OF EXPOSURE

Skin Contact, Eye Contact

#### EYE CONTACT

May cause skin/eye irritation

### SECTION 4 - FIRST AID MEASURES

#### EYE CONTACT

Immediately flush eyes with a large amount of water for at least 15 minutes. Get medical attention if irritation persists.

#### SKIN CONTACT

Wash skin thoroughly with soap and water. If irritation persists, seek medical attention. Contaminated clothing should be washed before reuse.

#### INGESTION

Give large amounts of water. Call a physician. Never give anything to an unconscious person.

**INHALATION** - Material is not expected to be harmful if inhaled. If inhaled, remove to fresh air.

#### INSTABILITY

This material is considered stable.

#### INCOMPATIBILITIES

Strong oxidizing agent. Contact with copper, aluminum or iron may cause corrosion and product degradation.

#### HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

Thermal decomposition or combustion may produce carbon monoxide, carbon dioxide, ammonia, oxides of nitrogen and/or hydrogen chloride.

#### HAZARDOUS POLYMERIZATION

Product will not undergo polymerization.

### SECTION 11 - TOXICOLOGICAL INFORMATION

#### POTENTIAL HEALTH EFFECTS

##### Effects of overexposure:

Acute oral (rat) LD50, acute dermal (rabbit) LD50 are estimated to be 4.67 g/kg greater than 10.0 g/kg. The 4 hour (rat) LC50 values are estimated to be greater than 15,000 ppm. No skin or eye irritation was produced during primary irritation studies with rabbits. No signs of dermal irritation or sensitization were produced during repeat insult patch test with human subjects.

Toxicological information on the OSHA regulated components of this product is as follows::

Product contains material(s) known to the State of California to cause cancer and birth defects or other reproductive harm.

### SECTION 12 - ECOLOGICAL INFORMATION

5 - Day BOD: <600 mg/L Oxygen

Algae (*Selenastrum capricornutum*), 96 hr EbC50 = 0.031 mg/L; 96 hr ErC50 = 0.058 mg/L  
LC50 determinations without added suspended solids overestimate the true toxicity of cationic polymers. Suspended solids and other dissolved organic materials like humic acid are present in natural waters and reduce the effective concentration of the polymer and thereby its toxicity.

#### LC50

BLUEGILL, 96 HOUR	0.39 mg/L
TROUT, 96 HOUR	0.16 mg/L
DAPHNIA, 48 HOUR	0.6 mg/L

OCTANOL/H<sub>2</sub>O PARTITION COEFF.

Not available

### SECTION 13 - DISPOSAL CONSIDERATIONS

#### PROCEDURE

The information of RCRA waste classification and disposal methodology provided below applies only to the product as supplied. If the material has been altered or contaminated, or it has exceeded the recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR part 261 et seq.) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCA "hazardous waste characteristics". Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicate if the product is a "listed hazardous waste". RCRA Hazardous Waste Characteristics. There are four characteristics defined in 40 CFR Section 261.21-61.24: *Ignitability, Corrosivity, Reactivity, and Toxicity*. To determine Ignitability, see Section 5 of this MSDS (flash point). For corrosivity, see Section 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 19 (incompatible materials). For Toxicity, see Section 2 (composition). Federal regulations are subject to change. State and local requirements,

24-HOUR EMERGENCY CONTACT:  
CHEMTREC: (800) 424-9300

which may differ from or be more stringent than the federal regulation, may also apply to the classification of the material if it is to be disposed. The foregoing has been provided for information only; the person generating the waste is responsible for determining the waste classification and disposal method. Follow all federal, state and local regulations.

#### SECTION 14 - TRANSPORT INFORMATION

N/A - Not Applicable; N/R - Not Regulated

	D.O.T	SHIPPING INFORMATION		
		IMO	ICAO/IATA	TRANSPORT CANADA
SHIPPING NAME	N/A ; N/R	N/A ; N/R	N/A ; N/R	N/A ; N/R
HAZARD CLASSIFICATION	N/A	N/A	N/A	N/A
UN NUMBER	N/A	N/A	N/A	N/A
IMDG PAGE	N/A	N/A	N/A	N/A
DOT HAZARDOUS SUBSTANCES	N/A	N/A	N/A	N/A
TRANSPORT LABEL	None	None	None	None
REQUIRED	Required	Required	Required	Required
PACKING INSTR	N/A	N/A	N/A	N/A
MAX NET QTY	N/A	N/A	N/A	N/A
TECHNICAL NAME (NOS)	N/A	N/A	N/A	N/A

#### SECTION 15 - REGULATORY INFORMATION

TSCA	This product is manufactured in compliance with all provisions of the Toxic Substances control Act, 15 U.S.C. 2601 et. seq.
CANADA DSL	Components of this product have been reported to Environment Canada in accordance with subsection 25 of the Canadian Environmental Protection Act and are included Domestic Substances List.
EEC EINECS	All components of this product are included in the European Inventory of Existing Chemical Substances (EINECS) in compliance with Council Directive 67/548/EEC and its amendments.

COMPONENT	CAS. NO	%	TPQ (lb.)	RQ (lb.)	S313	TSCA 12B
1,3- Dichloropropanol	000096-23-1	<0.05	None	None	NO	YES

## SECTION 16 - OTHER INFORMATION

### ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
MAK	Maximum Workplace Concentrations
TLV	Threshold Limit Value
PEL	Permissible Exposure Limit
TWA	Time Weighted Average
STEL	Short-Term Exposure Limit
BAC	Butyl acetate

The information presented herein is based on the content of a Material Safety Data Sheet provided by the manufacturer or other responsible party. Although the information provided herein is an accurate presentation of the original Material Safety Data Sheet safety information, no warranty or representation, expressed or implied, is made as to the accuracy or completeness of the foregoing data and safety information.



FINI ENTERPRISES, INC.  
 P.O. BOX 808  
 CELINA, TEXAS 75009  
 (214) 382-2381  
 (800) 441-2559  
 (214) 382-3211 (FAX)



## MATERIAL SAFETY DATA SHEET

### I. PRODUCT IDENTIFICATION

Manufacturer's Name:	Fe-3, Inc.	Regular Telephone No. 1 (214) 382-2381 Emergency Telephone No. (800) 424-9300
Address:	Business Rt. 289 North, Celina, Texas 75009	
Trade Name:	Fe <sup>3</sup>	
Synonyms:	FERRIC SULFATE SOLUTION	
Shipping Name:	DOT: CORROSIVE LIQUID, N.O.S. CORROSIVE MATERIAL (LIQUID FERRIC SULFATE — 50% WATER NA 1760)	

### II. HAZARDOUS INGREDIENTS

Material or Component (Typical)	Cas No.	% w/w	Hazard Data
Ferric Sulfate	10028-22-5	49.0	<b>Health hazard:</b> Product is toxic orally, is corrosive to the eye, and will burn the skin.
Free Sulfuric Acid	7664-93-9	.5-1.0	
Water (balance of formulation)			<b>Aquatic toxicity:</b> Ferric sulfate is listed as toxic to aquatic life, Category C. 40 CFR Parts 116-118.

### III. PHYSICAL DATA

Boiling Point, 750 mm hg	Approx. 212°F	Freezing Point: Does not freeze at 0°F
Specific Gravity (H <sub>2</sub> O=1)	1.425 to 1.455	Vapor Pressure: NA
Vapor Density (Air=1)	NA	Solubility in H <sub>2</sub> O% by Wt. Infinite
% Volatiles by Vol.	NA	Evaporation Rate (Butyl Acetate - 1)
Appearance and Odor	Red-Brown solution. No detectable odor.	Ph (as is) Approximately 1.0 Ph (1% soln) Approximately 4.8

### IV. FIRE AND EXPLOSION DATA

Flash Point (Test Method)	N.A.	Autoignition Temperature	N.A.
Flammable Limits in Air, % by Vol.	Lower N.A.	Upper N.A.	
Extinguishing Media	Product does not burn or support flame. If product is present in a fire, water, CO <sub>2</sub> or dry chemical may be used. Product is highly acidic and if in open container avoid splashing.		
Special Fire Fighting Proc.	Do not allow product or water containing product to enter a navigable stream. At temperatures above 600°C, product decomposes to iron oxide and sulfur trioxide.		
Unusual Fire & Explosion Hazard	None known.		

**V. HEALTH HAZARD INFORMATION**

Health Hazard Data	Hazard Classification	Basis for Classification	Source
<b>Routes of Exposure</b> Inhalation	Not determined, but expected to be low due to other toxicological tests, physical and chemical characteristics.	NA	NA
Skin Contact	Not a primary skin irritant by FHSA standards.	Primary dermal irritation index = 0.0 for 24 and 72 hours.	Laboratory test in accord with FHSA procedure.
Skin Absorption	Not toxic dermally by FHSA standards.	Est. dermal LD <sub>50</sub> (Rabbit) = (Male) Greater than 2.0 g/kg body weight (Female) Greater than 2.0 g/kg body weight	Laboratory test in accord with FHSA procedure.
Eye Contact	Corrosive to the eye by FHSA standards.	Eye irritation scores: 24 hours. . . . . 45.2 48 hours. . . . . 56.2 72 hours. . . . . 56.3 7 days . . . . . 63.4	Laboratory tests in accord with FHSA procedure.
Ingestion	Toxic by FHSA standards.	Oral LD <sub>50</sub> . (Rats-male) = Between 2.5 and 5.0 g/kg body weight. (Rats-female) = Between 2.5 and 5.0 g/kg body weight.	Laboratory tests accord with FHSA procedure.

**EFFECTS OF OVEREXPOSURE:**

Acute Overexposure: None known except as listed in Section V above.

Chronic Overexposure: None known except as listed in Section V above.

**EMERGENCY AND FIRST AID PROCEDURES**

EYES	Immediately irrigate with large amounts of water for at least 15 minutes. Hold eyelids apart during irrigation. Send patient to a physician immediately.
SKIN	Flush with water while removing clothing and shoes. Continue to flush for at least 15 minutes. Call a physician. Wash clothes before reuse.
INHALATION	Remove from area and give artificial respiration if needed and seek medical assistance.
INGESTION	Treat as a corrosive liquid. Drink large quantities of water or milk to reduce concentration and neutralize acid. Do not induce vomiting. Call physician immediately.

**VI. REACTIVITY DATA****CONDITIONS CONTRIBUTING TO INSTABILITY:**

None Known.

**INCOMPATIBILITY:**

Product solution is corrosive to mild steel, copper, copper alloys and galvanized steel. May be corrosive to paints, enamels, and concrete. Reacts with lime and other basic materials to form insoluble iron salts.

**HAZARDOUS DECOMPOSITION PRODUCTS:**

None normally. At temperatures above 600° C, sulfur trioxide may be released.

**CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION:**

None known.

**VII. DISPOSAL, SPILL OR LEAK PROCEDURE:****AQUATIC TOXICITY (e.g., 96 HR. TLM):**

No data is known to be available. EPA has rated ferric sulfate in Category C in the Waters Program hazardous substance list in 40 CFR Parts 116-118.

**WASTE DISPOSAL METHOD:**

Neutralize with lime, soda ash, or bicarbonate and remove to approved landfill.

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:**

Prohibit product from running into streams or navigable waters. Neutralize and remove to approved landfill. Wash down spill area with water. Check with waste treatment plant before flushing down large amounts of spilled product.

**NEUTRALIZING CHEMICALS:**

Lime (calcium carbonate, calcium hydroxide, calcium oxide), soda ash or sodium bicarbonate.

**VIII. SPECIAL PROTECTION INFORMATION:****VENTILATION REQUIREMENTS:**

No special ventilation is believed to be necessary under normal use conditions.

**SPECIFIC PERSONAL PROTECTION EQUIPMENT:****RESPIRATORY:**

None known necessary under normal use. If mists occur, or may occur, use a respirator having an activated carbon filter suitable for sulfuric acid mists.

**EYE:**

Chemical goggles should be worn when handling this product as it is corrosive to the eye.

**GLOVES:**

Chemical or rubber gloves should be worn.

**OTHER CLOTHING AND EQUIPMENT:**

Acid resistant clothing is recommended. Safety shoes are recommended when handling product in drums.

**IX. SPECIAL PRECAUTIONS:**

There should be a substance placard with UN1760, being of Hazard Class 8 and packing group III. 8, UN1760, III

**PRECAUTIONARY STATEMENTS:**

Product is corrosive to mild steel and containers should bear a corrosive D.O.T. label. There should be a substance placard with UN1760.

**OTHER HANDLING AND STORAGE REQUIREMENTS:**

Liquid Ferric Sulfate solution is corrosive to mild steel. Storage and equipment materials should include fiberglass, reinforced plastics, plastics, rubber, lead, type 304 or better grades of stainless steel.

**ADDITIONAL REGULATORY CONCERNS:****FEDERAL:****FDA:****USDA:****CPSC:**

**TSCA:** Is this product, or all its ingredients, being certified for inclusion on the Toxic Substances Control Act inventory of chemical substances? YES.

**OTHER:** The ferric sulfate meets the AWWA standard for Ferric Sulfate in potable water. Standard AWWA B406-87.

**STATE:**

**OSHA:** Product is a hazardous material as defined by 29 CFR Paragraph 1910, 1200 because it is corrosive to the eye.  
Product is not listed by the National Toxicology Program, the International Agency for Research on Cancer, nor the Registry of Toxic Effects of Chemical Substances (1981-82) as a carcinogen or potential carcinogen.

**SARA TITLE III:** Product contains the following listed toxic chemicals which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA TITLE III) and 40 CFR, Part 372.

<u>Listed Toxic Chemical</u>	<u>CAS#</u>	<u>Max % By Wgt.</u>
Sulfuric Acid	7664-93-9	.5-1.0

RQ, CORROSIVE LIQUIDS, N.O.S.  
(Contains FERRIC SULFATE)  
8, UN1760, PG III  
RQ = 1,000 Lbs.  
LIQUID FERRIC SULFATE



**ATTACHMENT F**

**PROPOSED PERMIT AMENDMENT  
REQUESTS**